EXHIBIT 5

Commission Opinion In the Matter of CERTAIN RECORDABLE COMPACT DISCS AND REWRITABLE COMPACT DISCS, US ITC Inv. No. 337-TA-474, 2004 WL 1435791 (2004)

Part 1 of 3

USITC Inv. No. 337-TA-474, Pub. No. 3686
United States International Trade Commission (U.S.I.T.C.)

Commission Determination
IN THE MATTER OF CERTAIN RECORDABLE COMPACT DISCS AND REWRITABLE COMPACT DISCS

USITC Inv. No. 337-TA-474

April 2004

CORRECTED NOTICE

UNITED STATES INTERNATIONAL TRADE COMMISSION

Commission Determination

In the Matter of CERTAIN RECORDABLE COMPACT DISCS AND REWRITABLE COMPACT DISCS AND REWRITABLE COMPACT DISCS

NOTICE OF COMMISSION DETERMINATION OF NO VIOLATION OF SECTION 337

Inv. No. 337-TA-474

March 11, 2004

AGENCY: U.S. International Trade Commission.
ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined that the U.S. patents asserted by complainant U.S. Philips Corporation are unenforceable for patent misuse, and has therefore found that there is no violation of section 337 of the Tariff Act of 1930 in the above-captioned investigation.

FOR FURTHER INFORMATION CONTACT: Clara Kuehn, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3012. Copies of the Commission's order, the public version of its opinion, the public version of the presiding administrative law judge's ("ALJ's") final initial determination ("ID"), and all other nonconfidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (*http://www.usitc.gov*). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on July 26, 2002, based on a complaint filed by U.S. Philips Corporation of Tarrytown, NY ("Philips" or "complainant"). 67 *FR.* 48,948 (2002). The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930 in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain recordable compact discs and rewritable compact discs by reason of infringement of certain claims of six U.S. patents: claims 1, 5, and 6 of U.S. Patent No. 4,807,209; claim 11 of U.S. Patent No. 4,962,493; claims 1, 2, and 3 of U.S. Patent No. 4,972,401; claims 1, 3, and 4 of U.S. Patent No. 5,023,856; claims 1-5, and 6 of U.S. Patent No. 4,999,825; and claims 20, 23-33, and 34 of U.S. Patent No. 5,418,764. 67 *FR* 48,948 (2002).

The notice of investigation named 19 respondents, including GigaStorage Corporation Taiwan of Hsinchu, Taiwan; GigaStorage Corporation USA of Livermore, California (collectively, "GigaStorage"); and Linberg Enterprise Inc. ("Linberg") of West Orange, New Jersey. 67 *FR* 48,948 (2002). On August 14, 2002, the ALJ issued an ID (Order No. 2) granting a motion to intervene as respondents by Princo Corporation of Hsinchu, Taiwan, and Princo America Corporation of Fremont, California (collectively, "Princo"). That ID was not reviewed by the Commission. GigaStorage, Linberg, and Princo ("respondents") are the only remaining active respondents in this investigation. *See* ALJ Order No. 6 (an unreviewed ID terminating eight respondents on the basis of a consent order); ALJ Order No. 17 (an unreviewed ID terminating each of three respondents on the basis of a consent order and settlement agreement); ALJ Order No. 18 (an unreviewed ID terminating one respondent on the basis of a consent order and settlement agreement); and ALJ Order No. 21 (an unreviewed ID finding four respondents in default).

On April 7, 2003, the ALJ issued an ID (ALJ Order No. 20) granting complainant's unopposed motion for summary determination that Linberg, GigaStorage, and Princo have each sold for importation, imported, and/or sold after importation products accused of infringing one or more of the asserted patent claims. That ID was not reviewed by the Commission.

A tutorial session was held on June 3, 2003, and an evidentiary hearing was held from June 10, 2003, through June 20, 2003.

On June 30, 2003, the ALJ issued an order (ALJ Order No. 32) granting a motion *in limine* filed by respondents to preclude complainant from asserting the doctrine of unclean hands with respect to respondents' affirmative defense of patent misuse.

The ALJ issued his final ID on October 24, 2003. Although he found that none of the asserted claims are invalid, that the accused products infringe the asserted claims, and that the domestic industry requirement of section 337 has been satisfied, he found no violation of section 337 because he concluded that all of the asserted patents are unenforceable by reason of patent misuse.

On November 5, 2003, complainant Philips petitioned for review of the portion of the final ID that found the asserted patents unenforceable due to patent misuse, and also appealed ALJ Order No. 32. On the same day, respondents filed a paper entitled "Statement of Respondents Princo Corp., Princo America Corp., Gigastorage Corp. Taiwan, Gigastorage Corp. USA, and Linberg Enterprises, Inc. Regarding the Initial Determination," in which respondents urged the Commission to adopt the ID in its entirety. Respondents and the IA filed responses to complainant's petition for review.

On December 8, 2003, the ALJ issued his recommended determination on remedy and bonding.

On December 10, 2003, the Commission determined to affirm ALJ Order No. 32, and to review all of the ID's findings of fact and conclusions of law concerning patent misuse. The Commission determined not to review the remainder of the ID.

In its review notice, the Commission invited the parties to file written submissions on the issues under review, and invited interested persons to file written submissions on the issues of remedy, the public interest, and bonding. The Commission also requested briefing from the parties on four questions. Initial submissions were filed on January 9, 2004, and replies were filed on January 16, 2004, and on January 20, 2004.

Having reviewed the record in this investigation, including the parties' written submissions, the Commission determined to affirm the ALJ's conclusion that the asserted patents are unenforceable for patent misuse *per se*, but on the ground that complainant's practice of mandatory package licensing constitutes a tying arrangement between licenses to patents that are essential to manufacture CD-Rs or CD-RWs according to Orange Book standards and licenses to other patents that are not essential to that activity.[FN1] The Commission determined to adopt the ALJ's conclusion that the asserted patents are unenforceable for patent misuse under a rule of reason standard based on the ALJ's analysis of and findings as to the tying arrangement.[FN2] We affirm the ALJ's conclusion that the patent misuse has not been shown to have been purged.

This action is taken under the authority of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in section 210.45 of the Commission's Rules of Practice and Procedure (19 C.F.R. 210.45).

By order of the Commission.

Marilyn R. Abbott

Secretary to the Commission

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FN1. We take no position on the ALJ's conclusion that the asserted patents are unenforceable for patent misuse *per se* based on theories of price fixing and price discrimination.

FN2. We take no position on the ALJ's conclusion that the royalty rate structure of the CD-R/RW patent pools is an unreasonable restraint of trade.

UNITED STATES INTERNATIONAL TRADE COMMISSION

Commission Determination

In the Matter of CERTAIN RECORDABLE COMPACT DISCS AND REWRITABLE COMPACT DISCS

ORDER

Inv. No. 337-TA-474

March 11, 2004

The Commission instituted this investigation on July 26, 2002, based on a complaint filed by U.S. Philips Corporation of Tarrytown, NY ("Philips" or "complainant"). 67 *FR* 48,948 (2002). The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930 (19 U.S.C. 1337) in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain recordable compact discs and rewritable compact discs by reason of infringement of certain claims of six U.S. patents: claims 1, 5, and 6 of U.S. Patent No. 4,807,209; claim 11 of U.S. Patent No. 4,962,493; claims 1, 2, and 3 of U.S. Patent No. 4,972,401; claims 1, 3, and 4 of U.S. Patent No. 5,023,856; claims 1-5, and 6 of U.S. Patent No. 4,999,825; and claims 20, 23-33, and 34 of U.S. Patent No. 5,418,764. 67 *FR* 48,948 (2002).

On October 24, 2003, the presiding administrative law judge ("ALJ") issued his final initial determination ("ID"). Although the ALJ found that none of the asserted claims are invalid, that the accused products infringe the asserted patent claims, and that the domestic industry requirement of section 337 had been satisfied, he found no violation of section 337 because he concluded that all of the asserted patents are unenforceable by reason of patent misuse.

On November 5, 2003, complainant Philips petitioned for review of the portion of the final ID that found the asserted patents unenforceable due to patent misuse, and also appealed ALJ Order No. 32, which granted a motion *in limine* filed by respondents to preclude complainant from asserting the doctrine of unclean hands with respect to respondents' affirmative defense of patent misuse. On the same day, respondents filed a paper entitled "Statement of Respondents Princo Corp., Princo America Corp., Gigastorage Corp. Taiwan, Gigastorage Corp. USA, and Linberg Enterprises, Inc. Regarding the Initial Determination," in which respondents urged the Commission to adopt the ID in its entirety. Respondents and the IA filed responses to complainant's petition for review.

On December 10, 2003, the Commission determined to affirm ALJ Order No. 32, and to review all of the ID's findings of fact and conclusions of law concerning patent misuse. The Commission determined not to review the remainder of the ID, thus adopting it. The Commission issued a notice dated December 10, 2003, in which it requested briefing on the issues under review. In accordance with that notice, all parties to this investigation filed timely written submissions, and timely reply submissions, regarding the issues under review.

Having reviewed the record in this investigation, including the ID and the written submissions of the parties, the Commission hereby **ORDERS THAT:**

1. We affirm the ALJ's conclusion that the asserted patents are unenforceable for patent misuse *per se*, but on the ground that complainant's practice of mandatory package licensing constitutes a tying arrangement between licenses to patents that are essential to manufacture CD-Rs or CD-RWs according to Orange Book standards and licenses to other patents that are not essential to that activity.[FN1]

2. We adopt the ALJ's conclusion that the asserted patents are unenforceable for patent misuse under a rule of reason standard based on the ALJ's analysis of and findings as to the tying arrangement.[FN2]

3. We affirm the ALJ's conclusion that the patent misuse has not been shown to have been purged.

4. This investigation is terminated based on a determination that there is no violation of section 337.

5. The Secretary shall serve copies of this Order on all parties of record and publish notice thereof in the *FR*.

By order of the Commission.

Marilyn R. Abbott

Secretary to the Commission

FN1. We take no position on the ALJ's conclusion that the asserted patents are unenforceable for patent misuse *per se* based on theories of price fixing and price discrimination.

FN2. We take no position on the ALJ's conclusion that the royalty rate structure of the CD-R/RW patent pools is an unreasonable restraint of trade.

PUBLIC VERSION

CONFIDENTIAL INFORMATION DELETED

COMMISSION OPINION

This section 337 investigation is before the Commission for final disposition of the issues under review and, if necessary, for determinations on remedy, the public interest, and bonding. We have determined to affirm the presiding administrative law judge's ("ALJ's") conclusion that the asserted patents in this investigation are unenforceable for patent misuse, and consequently find no violation of section 337 of the Tariff Act of 1930.

PROCEDURAL HISTORY

The Commission instituted this investigation on July 26, 2002, based on a complaint filed by U.S. Philips Corporation of Tarrytown, NY ("Philips" or "complainant"). 67 *Fed. Reg.* 48,948 (2002). The complaint, as supplemented, alleged violations of section 337 in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain recordable compact discs ("CD-Rs") and rewritable compact discs ("CD-RWs") by reason of infringement of claims of six U.S. patents (collectively, "the asserted patents"): claims 1, 5, and 6 of U.S. Patent No. 4,807,209 (issued February 21, 1989) ("the '209 patent"); claim 11 of U.S. Patent No. 4,962,493 (issued October 9, 1990) ("the '493 patent"); claims 1, 2, and 3 of U.S. Patent No. 4,972,401 (issued November 20, 1990) ("the '401 patent"); claims 1, 3, and 4 of U.S. Patent No. 5,023,856 (issued June 11, 1991) ("the '856 patent"); claims 1-5, and 6 of U.S. Patent No. 4,999,825 (issued March 12, 1991) ("the '825 patent"); and claims 20, 23-33, and 34 of U.S. Patent No. 5,418,764 (issued May 23, 1995) ("the '764 patent"). 67 *Fed. Reg.* 48,948 (2002).

The notice of investigation identified 19 respondents, including GigaStorage Corporation Taiwan of Hsinchu, Taiwan; GigaStorage Corporation USA of Livermore, California (collectively, "GigaStorage"); and Linberg Enterprise Inc. of West Orange, New Jersey ("Linberg"). 67 *Fed. Reg.* 48,948 (2002). On August 14, 2002, the ALJ issued an initial determination ("ID") (Order No. 2) granting a motion to intervene as respondents by Princo Corporation of Hsinchu, Taiwan, and Princo America Corporation of Fremont, California (collectively, "Princo"). That ID was not reviewed by the Commission and thereby became the Commission's determination. GigaStorage, Linberg, and Princo ("respondents") are the only remaining active respondents in this investigation.[FN1]

The ALJ issued his final ID on October 24, 2003. Although the ALJ found that the domestic industry requirement of section 337 is satisfied in this investigation, that the asserted patent claims are infringed by the accused products, and that the asserted claims are not invalid, he found no violation of section 337 because he concluded that all of the asserted patents are unenforceable by reason of patent misuse on the part of complainant Philips. ID at 139-220.

On November 5, 2003, complainant Philips petitioned for review of the subject ID in part. Respondents and the Commission investigative attorney ("IA") opposed the petition. On December 8, 2003, the ALJ issued his recommended determination on remedy and bonding. On December 10, 2003, the Commission determined to review all of the ID's findings of fact and conclusions of law concerning patent misuse. The Commission determined not to review the remainder of the ID. In its review notice, the Commission invited the parties to file written submissions on the issues under review, and it invited interested persons to file written submissions on the issues of remedy, the public interest, and bonding. The Commission also requested briefing from the parties on four questions. Initial submissions were filed on January 9, 2004, and replies were filed on January 16, 2004, and January 20, 2004.

STANDARD ON REVIEW

This investigation is before us on review of the ALJ's final ID on violation, which issued on October 24, 2003. Commission review of an ID is limited to the issues set forth in the notice of review and all subsidiary issues therein. *Certain Bar Clamps, Bar Clamp Pads, and Related Packaging Display and Other Materials*, Inv. No. 337-TA-429, Commission Opinion at 3 (January 1, 2001). "On review, the Commission may affirm, reverse, modify, set aside or remand for further proceedings, in whole or in part, the initial determination of the administrative law judge. The Commission may also make any findings or conclusions that in its judgment are proper based on the record in the proceeding." 19 C.F.R. § 210.45(c).

Once the Commission determines to review an initial determination, its review is conducted under a *de novo* standard. *Certain Polyethylene Terephthalate Yarn and Products Containing Same*, Inv. No. 337-TA-457, Commission Opinion at 9 (June 18, 2002). Upon review the "Commission has 'all the powers which it would have in making the initial determination,' except where the issues are limited on notice or by rule." *Certain Flash Memory Circuits and Products Containing Same*, Inv. No. 337-TA-382, Commission Opinion on the Issues Under Review and on Remedy, the Public Interest, and Bonding at 9-10 (June 2, 1997), USITC Pub. 3046 (July 1997) (quoting *Certain Acid-Washed Denim Garments and Accessories*, Inv. No. 337-TA-324, Commission Opinion at 5 (Nov. 1992)).

As stated in our review notice, we determined to review in part the ALJ's final ID. We thereby adopted as our own the unreviewed portions of the ID. With respect to the portions of the ID that are under review, the ALJ's findings, conclusions, and supporting analysis that are not inconsistent with this opinion are hereby adopted. The ALJ's findings, conclusions, and supporting analysis that are inconsistent with this opinion are not adopted.

ISSUES UNDER REVIEW

The ALJ found that the asserted patents are unenforceable for patent misuse by complainant Philips. He found patent misuse *per se* and also found patent misuse under a "rule of reason" standard. We affirm the ALJ's conclusion that the asserted patents are unenforceable for patent misuse *per se*, but on the ground, discussed below, that complainant's practice of mandatory package licensing constitutes patent misuse *per se* as a tying arrangement between (1) licenses to patents that are essential to manufacture CD-Rs or CD-RWs according to Orange Book standards[FN2] and (2) licenses to other patents that are not essential to that activity.[FN3] We also adopt the ALJ's conclusion that the asserted patents are unenforceable for patent misuse under a rule of reason standard based on the ALJ's analysis of and findings as to the tying arrangement.[FN4]

I. Analysis of Patent Misuse *Per Se*

Complainant argues that patent misuse *per se* premised on tying arrangements was eliminated by 35 U.S.C. § 271(d)(5). Respondents and the IA oppose this argument. Complainant also contends that, even apart from section 271(d)(5), Federal Circuit case law prohibits finding patent misuse *per se* based on a tying arrangement between two patent licenses (as opposed to between a patent license and a product). The IA takes the position that tying arrangements between two patent licenses should not be patent misuse *per se*, but should be analyzed under the rule of reason. Respondents oppose these arguments. For the reasons discussed in part A, *infra*, we conclude that section 271(d)(5) did not eliminate patent misuse *per se* premised on tying arrangements, and in part B, *infra*, we conclude that patent misuse *per se* may be based on a tying arrangement between two patent licenses. In part C, *infra*, we discuss the legal standard for demonstrating a tying arrangement between two patent li-

censes, and in part D, we apply that standard to the licensing arrangements at issue in this investigation.

A. Tying Arrangements as *Per Se* Patent Misuse

Section 271(d)(5) reads in relevant part as follows:

> No patent owner otherwise entitled to relief for infringement or contributory infringement of a patent shall be denied relief or deemed guilty of misuse or illegal extension of the patent right by reason of his having ... conditioned the license of any rights to the patent or the sale of the patented product on the acquisition of a license to rights in another patent or purchase of a separate product, unless, in view of the circumstances, the patent owner has market power in the relevant market for the patent or patented product on which the license or sale is conditioned.

35 U.S.C. § 271(d)(5).

As noted, complainant contends that 35 U.S.C. § 271(d)(5) eliminated patent misuse *per se* premised on tying arrangements. Respondents and the IA take the position that section 271(d)(5) did not eliminate patent misuse *per se* based on tying arrangements. Complainant further argues that, even apart from section 271(d)(5), Federal Circuit case law prohibits finding patent misuse *per se* based on a tying arrangement between two patent licenses. The IA argues that, even if section 271(d)(5) does not eliminate patent misuse *per se* based on tying arrangements, a tying arrangement between two patent licenses (as opposed to a tying arrangement between a patent license and a product) should not be deemed patent misuse *per se*.

We conclude, as did the ALJ, that under section 271(d)(5) an infringement action may be precluded by a patent misuse defense based on a patent tying arrangement that is found to be illegal *per se*. Pursuant to section 271(d)(5), the defense requires a finding of market power based on an analysis that includes an inquiry into whether substitutes for the patented product are available.

Section 271(d)(5) expressly refers to conditioning a patent license on (1) the purchase of a separate product or (2) the acquisition of another patent license. Thus, it encompasses both patent-product and patent-patent tie-ins with respect to a defense of patent misuse based on tying arrangements. In *Virginia Panel Corp. v. MAC Panel Co.*, the Federal Circuit reversed a district court's conclusion that a proposed licensing agreement conditioned on the prospective licensee's purchase of unpatented products constituted patent misuse. 133 F.3d 860, 868 (Fed. Cir. 1998). The Federal Circuit outlined the approaches to the analysis of patent misuse issues as follows:

> The courts have identified certain specific practices as constituting *per se* patent misuse, including so-called "tying" arrangements in which a patentee conditions a license under the patent on the purchase of a separable, staple good, *see, e.g., Morton Salt Co. [v. G.S. Suppiger Co.]*, 314 U.S. [488,] 491 [(1942)], and arrangements in which a patentee effectively extends the term of its patent by requiring post-expiration royalties, *see, e.g., Brulotte v. Thys Co.*, 379 U.S. 29, 33 (1964). Congress, however, has established that other specific practices may not support a finding of patent misuse. *See* 35 U.S.C. § 271(d) (1994); *Dawson Chem. Co. v. Rohm & Haas Co.*, 448 U.S. 176, 202 (1980) (construing earlier version of § 271(d)). A 1988 amendment to § 271(d) provides that, *inter alia*, in the absence of market power, even a tying arrangement does not constitute patent misuse. *See* 35 U.S.C. § 271(d)(5) (1994) (added by Pub. L. No. 100-703, § 201, 102 Stat. 4676 (1988)).
>
> When a practice alleged to constitute patent misuse is neither *per se* patent misuse nor specifically excluded from a misuse analysis by § 271(d), a court must determine if that practice is "reasonably within the patent grant, *i.e.*, that it relates to subject matter within the scope of the patent claims." *Mallinckrodt, Inc. v. Medipart, Inc.*, 976 F.2d 700, 708 (Fed. Cir. 1992). If so, the practice does not have the effect of broadening the scope of the patent claims and thus cannot constitute patent misuse. *Id.* If, on the other hand, the practice has the effect of extending the patentee's statutory rights and does so with an anti-competitive effect, that practice must then be analyzed in accordance with the "rule of reason." *Id.* Under the rule of reason, "the finder of fact must decide whether the questioned practice imposes an unreasonable restraint on competition, taking into account a variety of factors, including specific information about the relevant business, its condition before and after the restraint was imposed, and the restraint's history, nature, and effect." *State Oil Co. v. Kahn*, 118 S. Ct. 275, 279 (1997) (citing *Arizona v. Maricopa County Med. Soc.*, 457 U.S. 332, 343 & n.13 (1982)).

133 F.3d 860, 869 (Fed. Cir. 1997) (parallel citations omitted). In the above-quoted passage, the Federal Circuit recognized that the conditioning of a patent license on the purchase of a separable, staple good was a tying arrangement that constituted *per se* patent misuse, and that section 271(d) added a market power requirement.[FN5] Thus, the Federal Circuit has concluded that

section 271(d) did not eliminate *per se* patent misuse.

In support of its argument that the *per se* rule for patent misuse based on tying was eliminated by section 271(d)(5), complainant relies on the legislative history of the statute and a district court case, *Texas Instruments Inc. v. Hyundai Electronics Industries, Co.*, 49 F. Supp.2d 893 (E.D. Tex. 1999)). Complainant submits that the statute adds not just a market power test, but also a rule-of-reason balancing of anticompetitive and pro-competitive effects test. In *Texas Instruments*, the district court dismissed *Virginia Panel* as "merely recogniz[ing] that the courts have *historically* identified tying practices as constituting *per se* patent misuse." 49 F.Supp.2d at 910. (The district court did not address the discussion in *Virginia Panel* of the licensing proposal at issue.) The district court then discussed the legislative history of section 271(d)(5) as follows:

> [Section] 271(d)(5) specifically notes that patent misuse tying analysis is to be considered "in view of the circumstances," strongly suggesting that rule-of-reason analysis -- not *per se* analysis -- applies. According to the Supreme Court, when conducting a rule-of-reason analysis, "the factfinder weighs *all of the circumstances of a case* in deciding whether a restrictive practice should be prohibited as imposing an unreasonable restraint on competition." *Continental T.V. v. GTE Sylvania*, 433 U.S. 36, 49, 97 S.Ct. 2549, 2557, 53 L.Ed.2d 568 (1977) (emphasis added); *accord National Soc'y of Professional Engineers v. United States*, 435 U.S. 679, 690, 98 S.Ct. 1355, 55 L.Ed.2d 637 (1978).

49 F.Supp.2d 893 at 910-11. The district court quoted from remarks by Rep. Kastenmeier and Senators DeConcini and Leahy, including their discussions of the phrase "in view of the circumstances." 49 F.Supp.2d at 911-12. It found that the remarks expressed an intent to eliminate *per se* rules due to tying, and that "[n]o contrary statement appears in the legislative history of Section 271(d)(5)." 49 F.Supp.2d at 912.

The Federal Circuit recently stated in *International Business Machines Corp. v. United States*, 201 F.3d 1367 (Fed. Cir. 2000), that statutory interpretation "begin[s] with the language of the statute itself. If that language is clear and unambiguous, then it controls, and we need not -- indeed we may not -- go further." 201 F.3d at 1372 (2000). In deciding whether the language is clear and unambiguous, a court looks to "the language itself, the specific context in which that language is used, and the broader context of the statute as a whole." *Robinson v. Shell Oil Co.*, 519 U.S. 337, 341 (1997).

Section 271(d)(5) states that "[n]o patent owner otherwise entitled to relief for infringement ... of a patent shall be ... deemed guilty of misuse ... by reason of his having ... conditioned the license of any rights to the patent ... on the acquisition of a license to rights in another patent or purchase of a separate product, unless, *in view of the circumstances*, the patent owner has market power in the relevant market for the patent ... on which the license ... is conditioned." 35 U.S.C. § 271(d)(5) (emphasis added). The Federal Circuit has stated that undefined terms in a statute are deemed to "have their ordinary meaning, for which [one] may consult a dictionary." *IBM*, 201 F.3d at 1372. *The American College Dictionary* defines "in view of" as "in consideration of."[FN6] The same dictionary defines "circumstance" as "a condition, with respect to time, place, manner, agent, etc., which accompanies, determines, or modifies a fact or event." *Id.* at 219; *accord Black's Law Dictionary* 243 (6th ed. 1990) ("Circumstances. Attendant or accompanying facts, events or conditions. Subordinate or accessory facts; *e.g.* evidence that indicates the probability or improbability of an event"). Thus, in the context of section 271(d)(5), the phrase "in view of the circumstances" means "in consideration of the accompanying facts or conditions that determine whether" "the patent owner has market power in the relevant market for the patent or patented product on which the license or sale is conditioned."[FN7] Because the language of section 271(d)(5) is not ambiguous and the statutory scheme is coherent (*see Virginia Panel*, 133 F.3d at 869), we decline to follow *Texas Instruments Inc. v. Hyundai Electronics Industries Co.*, 49 F. Supp.2d 893, 912 (E.D. Tex. 1999)) (relying on legislative history to adopt an interpretation of section 271(d)(5) that is contrary to its plain meaning).[FN8] We are guided instead by the Federal Circuit's analysis of patent misuse, as articulated in *Virginia Panel*, 133 F.3d at 869, 871.

B. Applicability of *Per Se* Analysis to Package Licensing and Pooling Arrangements

Relying on *Standard Oil Co. v. United States*, 283 U.S. 163, 171, 174, 175 (1931), and *Broadcast Music, Inc. v. Columbia Broadcasting System, Inc.*, 441 U.S. 1, 24-25 (1979), complainant also argues that a *per se* analysis is inapplicable because the Supreme Court has instead used a rule of reason analysis in evaluating patent pools and package licenses. In *Standard Oil*, the Supreme Court recognized that the cross-licensing and division of royalties from blocking patents could be procompetitive. 283 U.S. at 171. The Court also "examine[d] the evidence to ascertain the operation and effect" (283 U.S. at 175) of certain agreements for cross-licensing and division of royalties between patentees of "competing patented processes" (283 U.S. at 175, 180-81). However, *Standard Oil* did not discuss any tying allegations. Although complainant asserts that *Standard Oil* involved

"a license that offered a package of patents and did not permit licensees to select which patents they preferred" (complainant's submission at 45 (citing *Standard Oil*, 283 U.S. at 174)), its citation does not support that statement. *See also* *Standard Oil*, 283 U.S. at 170 ("There is no provision in any of the agreements which restricts the freedom of the primary defendants individually to issue licenses under their own patents alone or under the patents of all the others; and no contract between any of them, and no license agreement with a [manufacturer of the product] executed pursuant thereto, now imposes any restriction upon the quantity of gasoline to be produced, or upon the price, terms, or conditions of sale, or upon the territory in which sales may be made. The only restraint thus charged is that necessarily arising out of the making and effect of the provisions for cross-licensing and for division of royalties.") Thus, *Standard Oil* does not preclude a *per se* analysis for tying arrangements.

The Supreme Court opinion in *Broadcast Music* also did not involve allegations of tying. Although the licensee (CBS) argued below that the blanket license at issue was an illegal tying arrangement, the district court rejected the tie-in argument because "direct negotiation with individual copyright owners is available and feasible." *Broadcast Music*, 441 U.S. at 6 (citing 400 F.Supp. 737, 781-83 (S.D.N.Y. 1975)). The Second Circuit affirmed the rejection of the tying argument. 562 F.2d 130, 135 (2d Cir. 1977). CBS did not petition for a writ of *certiorari* on that issue. *Broadcast Music*, 441 U.S. at 6-7, 25 n.43.

Complainant asserts that "the Federal Circuit has prohibited application of the *per se* misuse doctrine unless the practice at issue has been held to be *per se* illegal by the [Supreme] Court."[FN9] However, the Supreme Court has recognized that tying arrangements may be anticompetitive *per se*. *Jefferson Parish Hospital Dist. No. 2 v. Hyde*, 466 U.S. 2 (1984); *Morton Salt Co. v. G.S. Suppiger Co.*, 314 U.S. 488, 491 (1942); *see also* *Mallinckrodt v. Medipart Inc.*, 976 F.2d 700, 706, 708 (Fed. Cir. 1992) (holding that district court contravened *Windsurfing* precedent, but stating that "this is not a price-fixing or tying case, and the *per se* antitrust and misuse violations found in [*Bauer & Cie v. O'Donnell*, 229 U.S. 1 (1913); *Straus v. Victor Talking Machine Co.*, 243 U.S. 490 (1917); *Boston Store of Chicago v. American Graphophone Co.*, 246 U.S. 8 (1918)] and *Motion Picture Patents Co.* [*v. Universal Film Mfg. Co.*, 243 U.S. 502 (1917)] are not here present"). We recognize that the particular facts in the patent misuse cases involve a tying patent and a tied *product*, rather than a tying patent and a tied *patent*. However, finding patent misuse based on a tying arrangement between patents in a mandatory package license is a reasonable application of Supreme Court precedent.

More than thirty years before *Broadcast Music*, the Supreme Court held that the "block booking"[FN10] of copyrighted films was illegal *per se*. Thus, the Supreme Court has held the practice of mandatory package licensing of intellectual property illegal *per se*. The Court stated that "[w]e do not suggest that films may not be sold in blocks or groups, when there is no requirement, express or implied, for the purchase of more than one film. All we hold to be illegal is a refusal to license one or more copyrights unless another copyright is accepted." *United States v. Paramount Pictures, Inc.*, 334 U.S. 131, 159 (1948). In *Broadcast Music*, in contrast, "[t]he [d]istrict [c]ourt found that there was no legal, practical, or conspiratorial impediment to [the licensee's] obtaining individual licenses; [the licensee], in short, had a real choice." 441 U.S. at 24.

The IA and complainant urge the Commission to follow the lead of the DOJ Antitrust Division and use the rule of reason approach to evaluating package licenses that involve patent tying arrangements. The *Antitrust Guidelines for the Licensing of Intellectual Property* state that "[p]ackage licensing -- the licensing of multiple items of intellectual property in a single license or in a group of related licenses -- may be a form of tying arrangement if the licensing of one product is conditioned upon the acceptance of a license of another, separate product." U.S. Dep't of Justice & FTC, *Antitrust Guidelines for the Licensing of Intellectual Property* § 5.3 (1995) ("DOJ/FTC Antitrust Guidelines"). The DOJ/FTC Antitrust Guidelines state that "[i]f a package license constitutes a tying arrangement, the [DOJ and FTC] will evaluate its competitive effects under the same principles they apply to other tying arrangements." DOJ/FTC Antitrust Guidelines § 5.3. The DOJ/FTC Antitrust Guidelines also state that the DOJ will apply the rule of reason standard in deciding whether to challenge a tying arrangement:

> *In the exercise of their prosecutorial discretion*, the Agencies will consider both the anticompetitive effects and the efficiencies attributable to a tie-in. The Agencies would be likely to challenge a tying arrangement if: (1) the seller has market power in the tying product, (2) the arrangement has an adverse effect on competition in the relevant market for the tied product, and (3) efficiency justifications for the arrangement do not outweigh the anticompetitive effects. The Agencies will not presume that a patent, copyright, or trade secret necessarily confers market power upon its owner.

DOJ/FTC Antitrust Guidelines § 5.3 (footnotes omitted) (emphasis added). Given the DOJ's acknowledgment that its standard is a matter of prosecutorial discretion, the DOJ's choice of the rule of reason standard for its antitrust investigations provides

little guidance on the standard that we should apply in this investigation; however, it indicates that a *per se* approach is valid.

Complainant argues that "it would be poor public policy to adopt a *per se* approach that condemns all package licenses if market power is found." Complainant's submission at 47. It asserts that a mandatory package license of all patents in a pool may have no anticompetitive effects at all, while offering the well-recognized benefits of reduced transaction costs and reduced uncertainty concerning the rights needed to manufacture a product. Complainant is correct that a *per se* approach condemning *all* mandatory patent license packages is unwarranted because licensing blocking patents as a package is pro-competitive. The application of the *per se* patent misuse doctrine to tying arrangements in a mandatory package license would not, however, encompass blocking patent complexes so long as the traditional separate product requirement, discussed in part C, *infra*, is retained. *International Manufacturing Co. v. Landon*, 336 F.2d 723 (9th Cir. 1964).

The IA opposes even such a narrowly crafted *per se* rule. He suggests that, in the hypothetical situation "where 20 patentees, some of which refuse to license their blocking patents separately, have properly pooled into a mandatory package license 200 essential patents but have errantly included a single nonessential patent along with the essential ones," it would be improper to find patent misuse *per se* because "the anticompetitive effects of wrongly adding the one nonessential patent to the pool may be outweighed by the procompetitive effects of the arrangement, *e.g.*, reducing the transaction costs that would result if a licensee had to negotiate contracts with each licensee and avoiding a 'hold-out' situation where certain patent holders refuse to license their patents alone." IA's submission at 15-16. We do not find the IA's hypothetical persuasive, however, because it is not necessary to eliminate the package license in his hypothetical altogether in order to avoid patent misuse. All that is necessary is to provide potential licensees with a backstop -- the choice of individually licensing the patents; there is nothing wrong with offering the package license as an option, rather than as a requirement.[FN11]

Relying on *Jefferson Parish*, complainant urges us to examine the competitive consequences of the challenged conduct. The character of the potential harm flowing from including, in a mandatory package license of blocking patents, an extra patent license that is not necessary to use the blocking patents is widely recognized, *viz.*, the suppression of emerging technologies that compete with the technology covered by the extra patent license. CX-358 at 10; CX-357 at 9; CX-355 at 11. As the Supreme Court noted in *Jefferson Parish*:

> There is general agreement in the cases and among commentators that the fundamental restraint against which the tying proscription is meant to guard is the use of power over one product to attain power over another, or otherwise to distort freedom of trade and competition in the second product. This distortion injures the buyers of the second product, who because of their preference for the seller's brand of the first are artificially forced to make a less than optimal choice in the second. And even if the customer is indifferent among brands of the second product and therefore loses nothing by agreeing to use the seller's brand of the second in order to get his brand of the first, such tying agreements may work significant restraints on competition in the tied product.

Jefferson Parish, n.19 (quoting *Fortner Enterprises v. United States Steel Corp.*, 394 U.S. 495, 512-514 (1969) (dissenting opinion)). The inclusion of the extra, unneeded patent in the package with the blocking patents could foreclose competing technologies from use by manufacturers licensed under the package; because the manufacturers would obtain the unneeded patent with the package they might choose not to license any of the competing technologies. CX-358 at 10; CX-357 at 9; CX-355 at 11.[FN12]

Thus, for the reasons discussed above, we conclude that patent misuse *per se* may be based on a tying arrangement between two patent licenses.

C. Legal Standard for Demonstrating Patent Misuse *Per Se* Based on a Tying Arrangement Between Patent Licenses

As discussed *supra*, we have concluded that patent misuse *per se* may be based on a tying arrangement between two patent licenses. In *Senza-Gel Corp. v. Seiffhart*, 803 F.2d 661 (Fed. Cir. 1986), the Federal Circuit affirmed a grant of summary judgment on a defense of patent misuse *per se* premised on a patent-product tying arrangement. (*Senza-Gel* pre-dates enactment of section 271(d)(5).) In finding patent misuse, the *Senza-Gel* district court employed a three-step analysis, *viz.*, (1) whether two separable items are tied, (2) whether the tied item is a staple in commerce, and (3) whether the two items are tied in fact. The district court certified as a question for interlocutory appeal whether its three step analysis was proper for analyzing a patent misuse claim in the tying context. The Federal Circuit found "no impropriety in the district court's employment of the three-step

analysis," although the Federal Circuit "caution[ed] that [it was] not ... explicating all of the analytical parameters that may be applicable to patent misuse questions in future cases." 803 F.2d at 665. Complainant argues that, in addition to the market power requirement imposed by section 271(d)(5), to establish a tying arrangement in the patent misuse context, a proponent must also establish each of the three *Senza-Gel* elements.

Respondents assert that "[a] tying arrangement in patent licensing constitutes *per se* patent misuse where (1) the patentee has market power in a market for licensing certain essential patents (which the licensee may want to license), and (2) conditions the licensing of those patents on the acceptance of a license to other nonessential patents (which the licensee may not want to license)." Respondents' submission at 9. Respondents contend that not all mandatory package licenses are unlawful tying arrangements that would be subject to the *per se* rule. Relying on *Jefferson Parish*, respondents assert that "[t]ying only arises where the parties include in the pool *both* an item in which they legitimately have market power (*e.g.*, essential patents), and an item for which competition on the merits would otherwise occur (*e.g.*, nonessential patents), and refuse to offer a legitimate choice of obtaining each item separately." Respondents' reply at 25-26, 29 ("if only essential patents are 'tied' together in a single package, then the arrangement does not implicate the *per se* rule"). Respondents assert that because "'[n]onessential' patents by definition are not necessary to practice the Orange Book standard" "there could be competition among nonessential technologies." Respondents' reply at 5. Citing *Jefferson Parish*, they assert that the *per se* prohibition against tying protects competition by ensuring that it not be suppressed by leveraging the market power in the essential patents by tying the essential to nonessential patents.

We agree that establishing patent misuse *per se* based on a tying arrangement between patent licenses requires establishing both market power pursuant to section 271(d)(5) and conditioning (*i.e.*, the patent licenses are tied in fact). We disagree with respondents' position that the antitrust market demand standard should be used to determine whether the "tying" and "tied" patents are separate items. The Federal Circuit stated in *Senza-Gel* that "[t]he law of patent misuse in licensing need not look to consumer demand (which may be non-existent) but need look only to the nature of the claimed invention as the basis for determining whether a product is a necessary concomitant of the invention or an entirely separate product. The law of antitrust violation, tailored for situations that may or may not involve a patent, looks to a consumer demand test for determining product separability." 803 F.2d at 670 n.14.

We conclude that the second prong of the three-prong *Senza-Gel* analysis, *viz.*, whether the tied product is a staple in commerce, is inapplicable to tying arrangements between two patent licenses. In approving the three-prong standard applied by the district court to the patent-product tying arrangement at issue in *Senza-Gel*, the Federal Circuit cited *Dawson Chemical Co. v. Rohm & Haas Co.*, 448 U.S. 176 (1980). *Dawson Chemical* involved a process patent on a method of using the chemical propanil as an herbicide. 448 U.S. 176, 181-82 (1980). Before the Supreme Court, the petitioners did not dispute that their manufacture and sale of propanil with instructions for using it as an herbicide was contributory infringement of the patent under 35 U.S.C. § 271(c), but they raised the defense of patent misuse. 448 U.S. at 185-86. Section 271(c) defines contributory infringement, as follows:

> Whoever offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and *not a staple article or commodity of commerce suitable for substantial noninfringing use*, shall be liable as a contributory infringer.

35 U.S.C. § 271(c) (emphasis added). It was undisputed that propanil was a nonstaple article, *i.e.*, "one that has no commercial use except in connection with respondent's patented invention." 448 U.S. at 184, 186-87. The conduct at issue was the patentee's practice of licensing its patented method (the tying patent) only to purchasers of propanil (the tied product).[FN13] 448 U.S. at 186, 214. The question was whether the patentee's activities were not patent misuse because they fell within the safe havens of section 271(d)(1)-(3).[FN14] The Supreme Court focused on the relationship between 35 U.S.C. § 271(c) and (d), and held that "the provisions of 271(d) effectively confer upon the patentee, as a lawful adjunct of his patent rights, a limited power to exclude others from competition in nonstaple goods." 448 U.S. at 201.

The IA argues that the three-prong test articulated in *Senza-Gel* in reliance on *Dawson* --

> is structured to ensure that a patentee accused of an illegal tie has not engaged in conduct that falls within the safe haven of

> section 271(d)(1). However, the test is inapplicable here because the tying of two patents can never fall within the safe haven. This follows from the unquestionable fact that a third party under 271(c) -- the section that defines the breadth of the safe haven -- can never be found liable for contributory infringement for licensing a patent that it owns.

IA's reply at 13. We agree with the IA that the act of licensing a patent does not implicate contributory infringement under section 271(c). Thus, the staple/nonstaple distinction analyzed in *Dawson* would not be applicable to a patent-patent tying analysis, and that prong of the *Senza-Gel* analysis is not applicable here.

International Manufacturing Co. v. Landon, Inc., 336 F.2d 723 (9th Cir. 1964), while not binding precedent, is both on point and persuasive on the issue of applying the traditional separate product test (the first prong of the *Senza-Gel* analysis) in the context of patent-patent tieins.[FN15] In that case, the Ninth Circuit held that the mandatory package licensing of blocking patents was not patent misuse, distinguishing *American Securit Co. v. Shatterproof Glass Corp.*, 268 F.2d 769 (3d Cir. 1959), on the ground that the patents at issue in that case "could possibly be used independently without infringing one another."[FN16] 336 F.2d at 729. The Ninth Circuit reasoned that --

> it is not an unlawful tying arrangement for a seller to include several items in a single mandatory package when the items may be reasonably considered to constitute parts of a single distinct product. A license package containing blocking patents may be considered a single distinct product. By definition, blocking patents disclose interdependent parts of the same product. The product ... is no less a single product because its novel aspects are disclosed by two interlocking patents. In such a case, not only is it not unreasonable to treat both patents as constituting a single product, but also licensing them in a package deal appears to be the most practical way of making them available for public use....
>
> * * *
>
> Appellants argue that mandatory package licensing of blocking patents should not be condoned because it may result in a prospective licensee being compelled to accept an entire license package--thought by its owner to contain only interlocking patents -- even though the licensee believes that he can produce a commercially feasible product under only part of the license package.
>
> This argument is premised on a hypothetical set of facts not involved in our case. *If we had a case where the licensee could produce a commercially acceptable product utilizing one patent but not infringing the others in the package, then clearly we would not have a case involving blocking patents. That we do not have such a hypothetical case is confirmed by the fact that appellants have not attempted to show what kind of device could be made under one of the patents in this case without violating the other. It is further confirmed by the fact that the product that the appellants did in fact manufacture infringed both patents.*

336 F.2d at 730-31 (emphasis added) (footnote omitted). The Ninth Circuit noted that there was testimony that "possibly a structure can be made" that would infringe one patent without infringing the other, but found that the testimony "dealt with hypothetical possibilities insofar as physical structure is concerned, and not with any practical use which could be made of the structure." 336 F.2d at 731 n.5.

Thus we conclude that, in addition to the market power requirement imposed by section 271(d)(5), to establish a tying arrangement between patent licenses in the patent misuse context, a proponent must prove the first and third requirements of the *Senza-Gel* analysis, *viz.*, that the "tying" and "tied" patent licenses are "separate" and tied in fact.

D. The Licensing Arrangements Are Patent Misuse *Per Se* as a Tying Arrangement

The "tying" patent licenses are licenses for U.S. patents that are actually essential for the manufacture of CD-R/RWs in accordance with Orange Book standards, and the "tied" patent licenses are licenses for U.S. patents that the licensors have identified as "essential" but that are actually nonessential for the manufacture of CD-R/RWs. For the reasons discussed below, we conclude that each of the patents asserted in this investigation is unenforceable for patent misuse. In section 1, *infra*, we discuss the market power requirement of section 271(d)(5). The first and third prongs of the three-prong *Senza-Gel* test, *viz.*, the requirements that the "tying" and "tied" patent licenses be tied in fact and separate, are discussed in sections 2 and 3, *infra*.

We conclude that in the Philips-only CD-RW license (*e.g.*, CX-469C; FF 71, 72), licenses to the U.S. patents that are actually essential for the manufacture of CD-RWs in accordance with Orange Book standards (the "tying" patent licenses) are tied in

fact to a license to the Farla '692 patent (the "tied" patent license), that the market power requirement of section 271(d)(5) is met, and that the Farla '692 patent is "separate" from the tying patents.

We also conclude that in the Philips-only CD-RW license (*e.g.*, CX-469C; FF 71, 72), licenses to the U.S. patents that are actually essential for the manufacture of CD-RWs in accordance with Orange Book standards (the "tying" patent licenses) are tied in fact to a license to the Lockhoff '219 patent (the "tied" patent license), that the market power requirement of section 271(d)(5) is met, and that the Lockhoff '219 patent is "separate" from the tying patents. The Philips-only CD-RW license contains a list of so-called essential patents in Exhibit B4, and every option under the license requires the licensee to "choose[]" to license those essential patents. CX-469C art. 1.10. The list of patents in Exhibit B4 includes each of the six asserted patents in this investigation,[FN17] as well as the Farla '692 patent and the Lockhoff '219 patent. CX-469C, Exhibit B4 at 4, 5.

We conclude that in certain Philips-only CD-R licenses (*e.g.*, RX-872C) and in certain joint CD-R licenses (*e.g.*, 1999 Gigastorage CD-WO/MO Disc Agreement (RX-1832, RX-2024C, Trans. at 834), RX-755C), licenses to the U.S. patents that are actually essential for the manufacture of CD-Rs in accordance with Orange Book standards (the "tying" patent licenses) are tied in fact to a license to the Farla '692 patent[FN18] and to a license to the Lockhoff '219 patent (the "tied" patent licenses), that the market power requirement of section 271(d)(5) is met, and that the Farla '692 patent and the Lockhoff '219 patent are each "separate" from the tying patents. The list of so-called essential patents in certain Philips-only CD-R licenses (*e.g.*, RX-872C, PH 098381-82, 098404) includes each of the six asserted patents in this investigation, as well as the Farla '692 patent and the Lockhoff '219 patent.

We further conclude that in the 1999 Gigastorage joint CD-RW license (RX-903C), licenses to the U.S. patents that are actually essential for the manufacture of CD-RWs in accordance with Orange Book standards (the "tying" patent licenses) are tied in fact to each of the following "tied" patent licenses: a license to the Ricoh Iwasaki '149 patent; a license to the Sony Yamamoto '719 patent; a license to the Farla '692 patent; and a license to the Lockhoff '219 patent. We also conclude that each of these "tied" patents is "separate" from the tying patents, and that the market power requirement of section 271(d)(5) is met. The list of patents in Exhibit B5 of the license (RX-903C, PH002750-54) also includes each of the six asserted patents in this investigation, as well as each of the "tied" patents listed above.

1. The Market Power Requirement of Section 271(d)(5)

We find that the relevant market for analyzing market power is the United States market for licensing the essential U.S. patents for the manufacture of CD-R/RW discs in compliance with Orange Book standards, and adopt[FN19] the ALJ's market definition and market power analysis.[FN20]

Philips has market power in the United States market for licensing essential U.S. patents for the manufacture of CD-R/RWs according to Orange Book standards because, as the ALJ found, there are no close substitutes for CD-R/RWs (ID at 160-64); the relevant market for licensing essential CD-R/RW patents is coextensive with the relevant product market for CD-R/RWs because "manufacturers are constrained to enter into those licenses in order to make such unique products" (ID at 166-67); and licenses to at least some of the Philips patents are essential to the manufacture of CD-R/RWs (ID at 173). The ALJ did not, as complainant contends, erroneously presume that because complainant had a patent, it has market power. Identifying the "tying" patent licenses as licenses for U.S. patents that are essential for the manufacture of CD-R/RWs according to Orange Book standards, the ALJ's analysis demonstrates that the market power requirement of section 271(d)(5) is met.

2. Tied in Fact

To find patent misuse *per se* based on a tying arrangement between two patent licenses, in addition to finding that the market power requirement of section 271(d)(5) is met, we must also find that the "tying" and "tied" patent licenses are tied in fact. We find, as did the ALJ, that in the Philips-only CD-RW license (*e.g.*, CX-469C; FF 71, 72), licenses to the U.S. patents that are actually essential for the manufacture of CD-RWs in accordance with Orange Book standards (the "tying" patent licenses) are tied in fact to a license to the Farla '692 patent and are also tied in fact to a license to the Lockhoff '219 patent (the "tied" patent licenses).

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The ALJ found that, for the Philips-only CD-R and CD-RW licenses, the package of so-called "essential" patents had to be taken as a whole and a licensee could not break up the so-called "essential" patents by selecting only certain of the so-called "essential" patents to license individually. FF 69-73. Philips asserts that prospective licensees have been given the option to license patents individually. In support of this argument, Philips relies on the following language, which appears in several CD-RW joint licenses issued in 1999: "WHEREAS, Licensee understands, that Philips is willing to license *any one or more patent rights* for optical disc manufacturing, owned or controlled by Philips, whether within or outside of the CD-RW Standard Specification as defined hereafter and to disclose and make available the requested basic information, all on reasonable terms and conditions." CX-414C at 2 ("CD-RW Disc License Agreement" with[[* * *]](June 16, 1999)) (emphasis added).[FN21] Because complainant Philips has not identified *any* Philips-only CD-RW license, or *any* CD-R license (Philips-only or joint) that contains similar language, the cited language does not suggest that prospective licensees under the Philips-only CD-RW license or the CD-R licenses (Philips-only or joint) were given the option of licensing individual patents as opposed to being forced to take all of the so-called essential patents as found by the ALJ. FF 64, 69-72. Thus, in the Philips-only CD-RW license (CX-469C), licenses to the "tying" patents, *viz.*, the U.S. patents that are essential to the manufacture of CD-RWs in accordance with Orange Book standards (and which appear on the list of so-called essential patents in the license) are tied in fact to licenses to patents that appear on the list of so-called essential patents even though those patents are *not* actually essential to the manufacture of CD-RWs (*e.g.*, the Farla '692 patent).

Relying on the ALJ's factual findings, FF 93 and FF 94, complainant contends that prospective licensees have always had the option of choosing to negotiate individual licenses. We disagree with complainant's interpretation because the supporting deposition testimony cited by the ALJ refers to single-licensor package licenses, rather than to individual licenses. FF 93 and 94 read as follows:

> FF 93: "The current joint CD-R disc license makes clear that 'interested manufacturers may opt to take out individual licenses under the relevant patents of each of Philips, Sony and Taiyo Yuden instead of a combined license.' *See, e.g.*, RX-992C (PH [076996]); CX-451C (p. 2); [Depo. Trans. (Van Dijk) at] 53-54."
>
> FF 94: "The joint CD-RW disc license also makes clear to licensees that Sony, Ricoh, and Philips retain the right to separately license their patents rights related to CD-RW. *See, e.g.*, CX-436C (p.2)."

The Van Dijk deposition transcript cited by the ALJ in support of FF 93 discusses[**[CONFIDENTIAL INFORMATION DELETED]**]

[[CONFIDENTIAL INFORMATION DELETED]]Trans. Depo. (Van Dijk) at 53:12 - 54:25. Although complainant also relies on additional testimony from the same deposition, that testimony lends no support to its contention:

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[[CONFIDENTIAL INFORMATION DELETED]]Trans. Depo. (Van Dijk) at 71:13 - 73:17. In addition to being inconsistent with the deposition testimony of Van Dijk, Philips' interpretation of FF 93 and FF 94 is also inconsistent with the ALJ's statement that "[m]anufacturers in the market for CD-R/RW discs are unable to negotiate a reasonable royalty rate with Philips for only particular *blocking* patents for the purpose of making CD-R/RWs that comply with Orange Book standards" (ID at 182 n.111) (emphasis in the ID).

We find, based on the above, that licenses to each of the so-called "essential" patents are tied in fact in the Philips-only CD-RW and CD-R patent licenses, in that none of the so-called essential patents could be licensed individually for the manufacture of CD-RWs or CD-Rs apart from the package. We therefore find a tie in fact between the "tying" patent licenses (licenses for U.S. patents that are actually essential for the manufacture of CD-Rs or CD-RWs in accordance with Orange Book standards) and the "tied" patent licenses (licenses for so-called "essential" patents that are actually nonessential to the manufacture of CD-Rs or CD-RWs) in the Philips-only CD-RW and CD-R patent licenses.

With respect to the joint licenses for CD-R and CD-RW technology, we also find, based on the ALJ's findings and analysis, a tie in fact between the "tying" patent licenses (licenses for U.S. patents that are actually essential for the manufacture of CD-Rs or CD-RWs in accordance with Orange Book standards) and the "tied" patent licenses (licenses for so-called "essential" patents that are actually nonessential to the manufacture of CD-Rs and CD-RWs). Prior to 2000, as the ALJ found, the option to license only the essential patents of a single licensor, such as Philips, was not available. ID at 177-78; Trans. (Smith) at 1423-24; FF 166-67, 369-74. The ALJ further found, however, that even when the Philips-only and other individual licensor packages became available in 2000, licensees continued operating under pooled license agreements that included nonessential patents and that, indeed, 80 percent of CD-R/RW licenses worldwide currently are licensed under the joint licenses, while only 20 percent have a separate Philips-only license. FF 78, 95. The ALJ further found, as explained more fully below, that licensees were discouraged from purchasing the single licensor packages, as opposed to the joint license. Indeed, the ALJ specifically found that Philips offered no evidence that the anticompetitive effects of including many nonessential patents in the lists of essential patents in the CD-R/RW pools had dissipated. FF 602.

In support of its argument that prospective licensees have been given the option to license patents individually, complainant Philips notes that CX-414C ("CD-RW Disc License Agreement" with[[* * *]](June 16, 1999)) provides that "Philips is willing to license any one or more patent rights for optical disc manufacturing, owned or controlled by Philips, whether within or outside of the CD-RW Standard Specification." The record does not support complainant's argument. The quoted language also appears in the 1999 joint CD-RW license to Gigastorage (CX-420C at 2, FF 250). The ALJ heard testimony regarding negotiations concerning the 1999 Gigastorage licenses and found that Gigastorage was told that separate licenses from the licensors would be more expensive than a joint license, that separate licenses could not be converted to a joint license at a later date, and that the royalty rate was the same regardless of the number of patents used. FF 369-376. He found that manufacturers like Gigastorage were "forced to license technology that they do not want." ID at 194. We also note that the cited language is not present in more recent joint CD-RW license agreements. *See, e.g.*, Philips' complaint confidential appendix N, tabs 1, 7, 16, 17, and 18.[FN22]

The ALJ found that "[w]hen Gigastorage discussed with Philips entering into the CD-R patent pool license agreement, Gigastorage did not believe it needed a license to every patent in the pool and inquired into obtaining a license to less than all of the patents on Philips' patent list. Gigastorage hoped that by eliminating some patents the royalty rate would be lower. Philips responded that the royalty is the same regardless of the number of patents used." FF 376 (citing Trans. (J. Chen) at 840:15-841:13, 848:4-11, 918:12-919:7. The ALJ also found that "the evidence of record shows that manufacturers know enough about the patents in the pools to realize that they are being forced to license technology that they do not want." ID at 194 (citing Trans. (J. Chen) 918:4-920:7); FF 439. The relevant testimony of Mr. Chen of Gigastorage reads as follows:

> Q: You had a copy of the license and the patent list before you entered into the license; is that right, sir?
> A: In the --
> Q: No, I'm just asking you, you had a copy of the license and the patent list before you entered into the license with Philips?
> A: They give us, yes.
> Q: And you didn't look at that patent list, did you?
> A: Of course, yes. I just explained that. I will explain again. Before we signed the patent license, we have a patent list, because Philips offer us so-called standard joint license agreement to us, so of course, including the patent list. But in the patent list, there are over 100, over 100 patents. So - and also, there are a lot of irrelevant patents in the list, for example the CD audio, CD-ROM and CD-I, and also the CD-MO patent in the list. Of course, we have a list, and also, we expressed such opinion to Philips Taipei. So I have a phone call with Danny Lin. He's a manager of Philips Taipei who is in charge of patent licensing in Taiwan. I, on the phone, spoke with him regarding this issue, those patents we don't need, why they need to put in the list. But we got the answer I just explained. We got the answer, *even if you use one patent of the list or two or more, you still need to pay the same royalty rate, the same amount. So I have, before, we signed a joint license agreement*.
> Q: Mr. Chen, I want to direct you to tab 2 of your binder, which is a copy of your deposition testimony, and direct your attention to page 158, line 13. Page 158, line 13.
> A: Line 13.

> Q: You testified at your deposition "I have looked at the patent list, this is an attachment to the agreement, and there are so many numbers that I didn't look at them in detail, and I remember there were over 100." Do you remember that testimony?
>
> A: Yeah, that's my answer, right.
>
> JUDGE HARRIS: Yes, he remembers that.
>
> BY MS. AQUINO: So you didn't look at the patents in detail; correct?
>
> A: Yes. I also explained that we have a patent list, but we don't have the patent in very detail, but from the patent list, I remember in the deposition, I also explain to you, it's very easy to take a look in the list, there are different category for the patent. So at that time I explained to you they are CD audio, CD-ROM and CD-I and also the CD-MO in the patent list. So it's very obvious we don't need that, but in the detail, we don't have time, we don't have the manpower to go into the detail, and also, that's over 100 patents.

Trans. (J. Chen) at 918:4-920:7 (emphasis added).

Relying upon the italicized portion of the above-quoted testimony, complainant argues that, rather than demonstrating that Gigastorage could not choose the patents it wanted to license, the "testimony demonstrates only that Philips was prepared to license whatever patents Gigastorage wanted, but that the royalty would not change." Complainant's submission on review at 84. The ALJ concluded, however, that the witness understood Philips' response as a rejection of Gigastorage's request to license fewer patents at a lower royalty (*i.e.*, the witness "realize[d] that [he was] being forced to license technology that [he did] not want" (ID at 194)), rather than as expressing a willingness to license individually the patents in the CD-R joint license. The ALJ is in the best position to evaluate trial testimony, and we believe his interpretation is the correct one.[FN23]

As discussed above, we find, as did the ALJ, that licensees are unable to license individual patents but must take a license to all of the so-called "essential" patents. The availability of single-licensor package licenses would negate a tie in fact in the joint license between so-called essential patents that are owned by different licensors because the licensee has the option of single-licensor packages from each of the different licensors. The ALJ found, however, that Philips-only package licenses did not become available until 2000. ID at 177-78; Trans. (Smith) at 1423-24; FF 166-67, 369-74. We affirm his finding that the option to license only the essential patents of a single licensor under a single-licensor package license, as opposed to licensing every one of the so-called essential patents of every one of the licensors under a joint license, was not available earlier. We therefore find, in the joint licenses negotiated prior to that point in time, a tie in fact between the "tying" patent licenses (licenses for U.S. patents that are actually essential for the manufacture of CD-Rs or CD-RWs in accordance with Orange Book standards) and the "tied" patent licenses (licenses for so-called "essential" patents that are actually nonessential to the manufacture of CD-Rs or CD-RWs) regardless of ownership. In the joint licenses negotiated after that point in time, we find a tie in fact between the "tying" patent licenses (licenses for U.S. patents that are actually essential for the manufacture of CD-Rs or CD-RWs in accordance with Orange Book standards) and the "tied" patent licenses (licenses for so-called "essential" patents that are actually nonessential to the manufacture of CD-Rs or CD-RWs) owned by the same licensor.

3. Separability

As discussed in the previous section, we find that in the Philips-only CD-RW license (*e.g.*, CX-469C; FF 71, 72), licenses to the U.S. patents that are actually essential for the manufacture and sale of CD-RWs in accordance with Orange Book standards (the "tying" patent licenses) are tied in fact to a license to the Farla '692 patent (the "tied" patent license). We affirm the ALJ's finding that the Farla '692 patent, which is included in the Philips-only CD-RW patent license as a so-called "essential" patent, is actually nonessential to the manufacture of CD-RWs (or CD-Rs) according to Orange Book standards.[FN24]

Complainant asserts that "[t]here is no evidence or finding that any pooled patent is not infringed by the making of an Orange Book disc." Complainant's submission at 78. It notes that --

> [t]he ALJ's conclusion regarding which patents are "essential" and which patents should or should not be pooled together -- based ... on a standard that ignores whether patents are actually infringed -- has no applicability to the law of patent misuse based on tying which examines whether the alleged tied products are separate products by looking at the nature of the invention to determine whether the product is a "necessary concomitant of the invention." *See* *Senza-Gel*, 803 F.2d at 670 n.14. Whatever may be said of the ALJ's determination of essentiality, it was not based on what patent the licensee needs or infringes in making a licensed product.

Complainant's submission at 78 n.52 (citations omitted). We disagree with complainant's contentions, and find that the Farla '692 patent is "separate" from the tying patents.

The ALJ found that "[l]icenses to at least some of the Philips patents are essential to the manufacture of CD-R/RWs that are in technical and practical compliance with the Orange Book." ID at 173; FF 222. Contrary to complainant's contentions, the record in this investigation establishes that a licensee could produce an Orange Book compliant CD-R or CD-RW disc (using the so-called "essential" patents that are actually essential) without infringing the Philips Farla '692 patent.[FN25] The evidence supporting this finding is the testimony of respondents' expert (McLaughlin).[FN26]

Complainant generally asserts that the testimony of respondents' expert (McLaughlin) is not evidence that alternative technologies exist that do not infringe the patents. It notes that McLaughlin testified on cross-examination that he was "not intimately familiar with the term infringement," and asserts that "the ALJ refused to permit [complainant's counsel] to question Dr. McLaughlin on the importance of an infringement analysis in determining essentiality, stating that [the ALJ said that] 'this expert's task was not to consider the question of infringement but to consider the question of essentiality."' Complainant's reply at 29 n.24 (quoting Trans. at 1583). While McLaughlin stated that he was "not intimately familiar with the term 'infringement,"' we do not believe that this means that his testimony is incompetent that certain patents (including, *e.g.*, the Farla '692 patent) do not "cover" Calimetrics' alternative OPC and write strategy technology.[FN27] This is because in his testimony McLaughlin compared an exemplary claim in the patent at issue and explained why the technology was not covered. The hearing testimony cited by complainant does not suggest that the ALJ prevented complainant from questioning McLaughlin about his findings concerning those patents on cross-examination.

The ALJ found that the "claims of the Farla '692 patent are directed to a particular method of carrying out a strategy for writing data, otherwise known as a 'write strategy,' onto a blank recordable disc." ID at 201; FF 471-72. He noted that "Dr. McLaughlin testified that at least one economically viable alternative for performing write strategy exists that does not infringe the Farla patent," and that "Dr. McLaughlin identified an OPC and write strategy method available from Calimetrics, Inc., where he is employed as a Principal Scientist, as an alternative that is not covered by the Farla '692 patent and that would comply with the requirements of the Orange Book if it were used." ID at 203; FF 482-485; Trans. (McLaughlin) at 1493:3-8; 1520:16-22; 1527:7-1528:8; 1563:18-1564:23; 1571:3-1571:10.

Complainant asserts that, rather than requiring that respondents prove patent misuse, the ALJ improperly shifted the burden of proof on the issue to it. Complainant contends that the ALJ required it to demonstrate that the Farla '692 patent had been removed from the CD-RW licenses, although the burden of proof should have remained on respondents to demonstrate that the Farla '692 patent was still included in the CD-RW licenses.

In response, respondents assert that "[g]iven that there was undeniable evidence that Farla was listed as essential in the past, the ALJ properly placed the burden on Philips to show that it no longer was [on the list of essential patents]. (FF 486, 488.) In any event, the fact that a nonessential patent has in the past been on the list is sufficient to support a finding of patent misuse." Respondents' reply at 85 n.46.

The ALJ did not shift the burden of proof on this issue to complainant. The ID states as follows:

> The [Farla '692] patent was included in the CD-R license agreement for many years before it was removed from the list of essential patents in 2001. *Compare* RX-840; RX-778; RX-755; RX-914. However, at least as of a license agreement signed in January 2002, the Farla '692 patent was still being listed as an essential patent under the CD-RW license agreement. *See* RX-770 at PH087634.
>
> It is unclear whether the Farla '692 patent remains listed on Philips' standard license agreements as an essential patent in the CD-RW pool. Philips' website of form license agreements does not include the lists of essential and nonessential patents for the CD-RW disc pool. *See* "Philips Intellectual Property and Standards, CD-R/RW Patents," *at* http://www.licensing.philips.com/licensees/patent/ob/ (CD-R/RW hyperlink) (last visited on August 26, 2003). In the absence of evidence to the contrary, it can only be assumed that the Farla '692 patent continues to be listed as an essential patent on the form CD-RW license as well as on the agreements of all existing CD-RW licenses. As such, it unreasonably forecloses competition from alternative technologies that also comply with the Orange Book.

ID at 204-05 (emphasis added). Thus, the basis for the ALJ's conclusion that the Farla '692 patent continues to be listed as an essential patent in CD-RW licenses is that, although the patent had been removed in 2001 from the list of essential *CD-R patents*, the patent was still listed as an essential patent in a 2002 *CD-RW* patent license (RX-770 at PH087634 (Jan. 1, 2002)). The ALJ could permissibly infer from this evidence that the Farla '692 continues to be listed as an essential CD-RW patent. No party has directed us to evidence in the record that the patent has been removed from the list of essential CD-RW patents. We conclude that complainant's arguments concerning the Farla patent are without merit.

As discussed above, the record in this investigation establishes that a licensee could produce an Orange Book compliant CD-RW disc without infringing the Philips Farla '692 patent. Thus, the Farla '692 patent is not in a blocking relationship with the U.S. patents that are actually essential for the manufacture of CD-RWs, and we find that the Farla '692 patent is separate from those patents.

As discussed in the previous section, we also find that in certain joint CD-R and CD-RW licenses there is a tie in fact between the "tying" patent licenses (licenses for U.S. patents that are actually essential for the manufacture of CD-Rs or CD-RWs in accordance with Orange Book standards) and the "tied" patent licenses (licenses for so-called "essential" patents that are actually nonessential to the manufacture of CD-Rs or CD-RWs) regardless of ownership. For the reasons discussed below, we affirm the ALJ's findings that the Ricoh Iwasaki '149 patent and the Sony Yamamoto '719 patent, which are included in certain joint licenses, are actually nonessential to the manufacture of CD-RWs (or CD-Rs) according to Orange Book standards, and find that they are separate from the essential patents in the joint licenses.

The ALJ found that "[l]icenses to at least some of the Philips patents are essential to the manufacture of CD-R/RWs that are in technical and practical compliance with the Orange Book." ID at 173. As discussed below, the record in this investigation establishes that a licensee could produce an Orange Book compliant CD-RW disc using the so-called "essential" patents that are actually essential, without infringing either the Ricoh Iwasaki '149 patent or the Sony Yamamoto '719 patent.[FN28] Thus, none of these patents is part of the complex of blocking patents that are required for the manufacture of Orange Book compliant CD-R or CD-RW discs, and we conclude that each of these patents is "separate" from the "tying" patents.[FN29]

The Iwasaki '149 Patent

The ALJ found that the "claims of the Iwasaki '149 patent are directed to a particular method of performing the OPC procedure, which is setting laser power to an appropriate level to record onto a particular disc." ID at 205; Trans. (McLaughlin) at 1516:24-1518:7; 1520:24-1521:11. He also found that "at least one economically viable alternative for performing OPC exists that does not infringe the Iwasaki '149 patent," and that "[t]he OPC and write strategy method available from Calimetrics, Inc. was identified by Dr. McLaughlin as an alternative that is not covered by the Iwasaki patent and would comply with the requirements of the Orange Book if it were used." ID at 205-06; 1517:2-20; 1521:12-1522:13; 1563:18-1564:23; 1571:3-10.

Complainant states that the Ricoh Iwasaki '149 patent is not listed as a patent in the CD-R patent pool and that Ricoh is not a CD-R pool licensor.

The ALJ found the Ricoh Iwasaki '149 patent to be nonessential, reasoning as follows:

> Respondents contend, without contest by Complainant, that the Ricoh Iwasaki '149 patent is nonessential and should not be included as such in the Philips CD-R and CD-RW patent pools. RPHB at 13-15. The claims of the Iwasaki '149 patent are directed to a particular method of performing the OPC procedure, which is setting laser power to an appropriate level to record onto a particular disc. McLaughlin Tr. 1516:24-1518:7; RX-52 (Iwasaki '149 patent). The OPC method defined by the Iwasaki patent consists of calculating a standardized gradation factor by monitoring the amplitudes of signals from test data patterns. McLaughlin Tr. 1520:23-1421:11; RX-52 (Iwasaki '149 Patent).
>
> Respondents assert that the Iwasaki '149 patent is not essential to practice the Orange Book for at least two reasons. First, the Orange Book does not mandate a particular method for carrying out the OPC function. McLaughlin Tr. 1507:10-1509:17; RX-407C (Orange Book CD-R Standard at PH015759); RX-408C (Orange Book CD-RW Standard at PH023331-023332). Philips's employee and technical witness, Hans Mons, testified that some of the characteristics the Orange Book defines for CD-Rs and CD-RWs are not mandatory, and that Orange Book-compliant CD-Rs and CD-RWs do not need to conform to the non-mandatory characteristics defined by the Orange Book. Mons Tr. 453:18-454:2;

McLaughlin Tr. 1504:10-18.

Second, as stated earlier in connection with the Farla '692 patent, the Iwasaki '149 patent is not essential as a practical matter because at least one economically viable alternative for performing OPC exists that does not infringe the Iwasaki '149 patent. McLaughlin Tr. 1563:1-12. The OPC and write strategy method available from Calimetrics, Inc. was identified by Dr. McLaughlin as an alternative that is not covered by the Iwasaki patent and would comply with the requirements of the Orange Book if it were used. McLaughlin Tr. 1521:12-1522:13; 1523:5-13.

Finally, Respondents contend that the Calimetrics method is not covered by the Iwasaki '149 patent. McLaughlin Tr. 1521:12-18. The Iwasaki patent requires the calculation of a certain mathematical quantity, and the calculation of that mathematical quantity does not occur during the Calimetrics OPC procedure. McLaughlin Tr. 1521:19-1522:13.

Dr. Rubenstein has not rendered any opinion as to the essentiality of the Iwasaki '149 patent. Rubenstein Tr. 2263:11-2264:12. Neither has Complainant offered any expert testimony to counter the evidence presented by Dr. McLaughlin on the patent's nonessentiality. Thus, the evidence of record demonstrates that the Iwasaki '149 patent is nonessential to the practice of the Orange Book, and its inclusion among the list of "essential" patents in the pools unreasonably forecloses competition.

ID at 205-06. To the extent that the ALJ found the Iwasaki '149 patent to be "nonessential" to practice the CD-R technology, we modify the ALJ's findings of fact to reflect that the record indicates that the patent concerns only CD-RW technology. Trans. (McLaughlin) at 1500-01; RX-2381.

In his ID the ALJ specifically relied on the fact that complainant did not challenge the testimony of respondents' expert (McLaughlin) concerning the Iwasaki '149 patent. Nonetheless, in its submission on review, complainant now asserts that the OPC procedure in attachment C3 of Part III of the Orange Book is mandatory because certain parameters must be included in the ATIP. It contends that the OPC procedure in attachment C3 is mandatory because these parameters are determined according to that OPC procedure. Complainant's argument is not persuasive, however, because there is testimony in the record that, although attachment C3 "gives an example of an OPC-like procedure" in section 3.3 (CX-162C at PH023332), the title of the section, "A procedure for the determination of the OPC parameters for media," indicates that "there's more than one way to do that." Trans. (McLaughlin) at 1509:3-17. We conclude that the ALJ's findings of fact are not clearly erroneous.

The Yamamoto '719 Patent

The ALJ found that the "claims of the Yamamoto '719 patent contain functional limitations for creating a master disc. [Trans. (McLaughlin) at] 1534:14-25; RX-50. The limitations define a method of using a single laser beam to create a master containing both a wobbled pre-groove and pre-recorded data." ID at 206. He further found that "[a]t least one economically viable alternative for creating a master exists that does not infringe the Yamamoto patent. [Trans. (McLaughlin) at] 1535:7-15. According to Dr. McLaughlin, the Calimetrics two-beam mastering method is a commercially viable alternative to the patent. [Trans. (McLaughlin) at] 1568:3-15;1570:1-9." ID at 207.

Complainant contends that the ALJ's reasoning is erroneous because it depends on McLaughlin's erroneous construction of the claims of the Yamamoto patent. According to complainant, the claims are not limited to producing a master disc with a single laser beam. It asserts that because, for example, claim 7 uses the transition term "comprising," "infringement of this claim requires *at least one recording beam*, but it is plainly not limited to exclude methods using more than one beam." Complainant's submission app. B at 41 (emphasis in original). Complainant further argues that McLaughlin did not testify that Calimetrics developed a two-beam mastering technique, but merely speculated about possible alternatives to the Yamamoto patent.

We do not find complainant's argument that the scope of the claims of the Yamamoto patent is not restricted to a single recording beam persuasive. The "Background of the Invention" section of the Yamamoto patent specification states that "[h]itherto, in the case of forming patterns of different widths onto a mother disc, the pits 31, groove 32, and recording spots corresponding to their widths are prepared and both of these recording spots are switched." RX-50, col. 1, ll. 23-27. The specification goes on to identify as a "problem" the fact that "since it is necessary to form two beams, the laser power must ... be set to a large value." RX-50, col. 1, ll. 37-38. The "Summary and Object of the Invention" section of the patent specification specifically states that "an object of the present invention [is] to provide an optical recording apparatus in which both the pits and a wide groove can be formed by *using only one recording spot* and the foregoing drawbacks are eliminated." RX-50, col. 1, ll. 46-50 (emphasis added). The specification goes on to state that "[b]oth of the pits and the wide groove are formed by *using*

the single recording beam as explained above. Thus, the foregoing problem which ... occurs when two beams are switched and used can be avoided." RX-50, col. 2, ll. 7-11 (emphasis added). *See also* RX-50, col. 4, ll. 38-43, 46-48. Thus, the specification identifies a problem and clearly states that the use of a single recording beam in the present invention avoids the problem.

The ALJ stated that McLaughlin referred to the two-beam mastering method that is a commercially viable alternative to the Yamamoto patent as "Calimetrics two-beam mastering method." ID at 207 (citing Trans. (McLaughlin) at 1568:3-15, 1570:1-9). We agree with complainant that the supporting testimony (*see also* 1568:16-20 and 1571:3-10) does not identify the two-beam mastering method as a Calimetrics method. McLaughlin did testify, however, that the two-beam method is a commercially viable alternative to the Yamamoto patent. We conclude that complainant's argument regarding the scope of the Yamamoto patent claims and its argument that the two-beam alternative to the Yamamoto patent is speculative are without merit.

The Lockhoff '219 Patent

As stated above, we find that in certain Philips-only CD-R licenses (*e.g.*, RX-872C), licenses to the U.S. patents that are actually essential for the manufacture of CD-Rs in accordance with Orange Book standards (the "tying" patent licenses) are tied in fact to a license to the Lockhoff '219 patent and to a license to the Farla '692 patent (the "tied" patent licenses). As also discussed in the previous section, we find that in the Philips-only CD-RW licenses (*e.g.*, CX-469C; FF 71, 72), licenses to the U.S. patents that are actually essential for the manufacture of CD-RWs in accordance with Orange Book standards (the "tying" patent licenses) are tied in fact to a license to the Lockhoff '219 patent. For the reasons discussed below, we affirm the ALJ's finding that the Lockhoff '219 patent is actually nonessential to the manufacture of CD-Rs or CD-RWs according to Orange Book standards, and find that it is separate from the essential patents.

The Lockhoff '219 patent is directed to a method of copy control (FF 553). Complainant contends that because the Lockhoff '219 patent is "technically essential" to practice the Orange Book standard, the fact that an alternative technology exists to the Lockhoff '219 patent is irrelevant for purposes of an "essentiality" analysis -- because a "technically essential" patent reads on the Orange Book. The ALJ found the evidence in conflict, however, and relied on the hearing testimony of respondents' expert McLaughlin. ID at 213.

The ALJ stated that Rubenstein found the Lockhoff '219 patent to be technically essential (ID at 212). The ALJ took specific note of RX-126C (May 14, 2002 Rubenstein Status Report) at PH065726), which is the relevant evidence complainant identifies on this point.[FN30] The ALJ found that alternative methods existed "such as embedding the copy control in the content" and that "[e]mbedding copy control in the content would satisfy the Orange Book but would not be covered by the Lockhoff '219 patent." FF 556, 557 (citing Trans. (McLaughlin) at 1529:14-1531:21). Thus, we affirm the ALJ's findings of fact, and find that the Lockhoff '219 patent is separate from the essential patents.

4. Conclusion

For the reasons discussed above, we conclude that the patents asserted in this investigation are unenforceable for patent misuse *per se*.

II. Analysis of Patent Misuse Under the "Rule of Reason" Standard

The ALJ also found patent misuse under the rule of reason standard. ID at 152-53, 182-83, 219-20. He found that complainant's CD-R/RW patent license agreements included as so-called "essential" patents for manufacturing CD-R/RW discs according to the Orange Book standard certain patents that were actually nonessential. ID at 185-213. He concluded that this practice constituted an extension of complainant's statutory right to exclude under its patents. ID at 183-85. He also found that such inclusion of nonessential patents in the license agreements had the anticompetitive effect of foreclosing competition in alternative technology that competes with the technology covered by a nonessential patent that was included as a so-called "essential" patent. ID at 196-213. We adopt this portion of the ALJ's analysis under the rule of reason standard with the modifications discussed below.

As to the ALJ's conclusion that certain patents included as so-called "essential" patents in complainant's licensing agreements

are actually nonessential, we adopt the ALJ's analysis and conclusions with respect to the Farla '692 patent, the Yamamoto '719 patent, the Lockhoff '219 patent, and the Iwasaki '149 patent.[FN31] We take no position on the ALJ's conclusion that the following patents included as so-called "essential" patents in the licensing agreements are actually nonessential: the Kramer '493 and '209 patents, the Ogawa '994 patent, the Lagadec '565 patent, the Spruit '351 patent, the Mimnagh '462 patent, and the Hamada '388 and '009 patents.

The ALJ also found that the CD-R/RW patent pooling arrangements between complainant and its colicensors constituted horizontal agreements among competitors who controlled the royalty rate for patents in the pools, and concluded that these horizontal restraints rose to the level of patent misuse *per se* as price fixing and price discrimination. We take no position on these conclusions, and also take no position on the ALJ's conclusion that the royalty rate mechanism of the patent pooling arrangements is an unreasonable restraint on competition.[FN32]

As explained below, we find patent misuse under the rule of reason standard based on the ALJ's findings that the Philips-only CD-RW license included as a purported essential patent the Farla '692 patent, which is in fact nonessential; that such inclusion had the anticompetitive effect of foreclosing an alternative technology developed by Calimetrics; and that the anticompetitive effects outweigh the procompetitive effects. We also find patent misuse under the rule of reason standard based on the ALJ's findings that certain joint CD-RW licenses (*e.g.*, RX-903C) included as purported essential patents the Philips Farla '692 patent and the Ricoh Iwasaki '149 patent, which are in fact nonessential; that such inclusion had the anticompetitive effect of foreclosing an alternative technology developed by Calimetrics; and that the anticompetitive effects outweigh the procompetitive effects.

A. Legal Standard for Patent Misuse under the Rule of Reason

We adopt the ALJ's articulation of the legal standard for finding patent misuse under the rule of reason. ID at 182-83. Essentially, "[a] rule of reason analysis requires a determination of whether an agreement is on balance an unreasonable restraint of trade, that is, whether its anticompetitive effects outweigh its pro-competitive effects." *Columbia Broad. Sys., Inc. v. Am. Soc'y of Composers, Authors & Publishers*, 620 F.2d 930, 934 (2d Cir. 1980) (citing *Nat'l Soc'y of Prof'l Eng'rs v. United States*, 435 U.S. 679 (1978); *Cont'l T.V., Inc. v. GTE Sylvania, Inc.*, 433 U.S. 36 (1977); and *Bd. of Trade of Chicago v. United States*, 246 U.S. 231 (1918)).

A rule of reason analysis should be applied in evaluating allegations of patent misuse that do not constitute patent misuse *per se*. *Virginia Panel Corp. v. MAC Panel Co.*, 133 F.3d 860, 869 (Fed. Cir. 1997) (referencing the rule of reason standard applied in the antitrust case *State Oil Co. v. Kahn*, 118 S. Ct. 275, 279 (1997)). To the extent that respondents' arguments with respect to the cases of *Berlenbach v. Anderson & Thompson Ski* Co., 329 F.2d 782 (9th Cir. 1964); *Jack Winter, Inc. v. Koratron Co.*, 375 F. Supp. 1 (N.D. Cal. 1970); and *Columbus Auto. Corp. V. Oldberg Mfg. Co.*, 264 F. Supp. 779 (D. Colo. 1967), *aff'd*, 387 F.2d 643 (10th Cir. 1968), are understood as urging us to adopt a different course, we reject those arguments.[FN33]

The ALJ found patent misuse because nonessential patents are included in the list of so-called "essential" patents in the licenses at issue, and such inclusion forecloses economically viable alternative technology for making CD-R/RWs that competes with technology covered by the "nonessential" patent. He found the Farla '692 patent to be "nonessential" because respondents' expert (McLaughlin) "testified that at least one economically viable alternative for performing write strategy exists that does not infringe the Farla patent." ID at 203. The ALJ found that McLaughlin identified an economically viable alternative for performing an Optimum Power Control (OPC) and write strategy available from Calimetrics that would comply with the requirements of the Orange Book if it were used and that was not covered by the Farla '692 patent. ID at 203-04; FF 482-485. He also found the Iwasaki '149 patent to be "nonessential" because McLaughlin identified an economically viable alternative for performing OPC available from Calimetrics that is not covered by the Iwasaki patent and would comply with the requirements of the Orange Book if it were used. ID at 205-06.

In its petition for review, complainant asserts that the *per se* standard of patent misuse in tying cases that was applied in *American Securit Co. v. Shatterproof Glass Corp.* has been legislatively over-ruled by the 1988 Patent Misuse Reform Act, which it characterizes as imposing (as a threshold requirement) a finding of market power and requiring a "rule of reason" analysis in analyzing patent misuse.[FN34] Complainant submits that because an inquiry under the "rule of reason" is now re-

quired to support a finding of patent misuse in a tying case, *Shatterproof's* holding that mandatory package licensing extends the scope of a patent is no longer good law.[FN35]

Relying on *International Manufacturing Co. v. Landon, Inc.*, 336 F.2d 723 (9th Cir. 1964),[FN36] complainant argues that *Shatterproof* "does not support a determination that Philips has broadened the scope of its CD-R or CD-RW patents by package licensing them." Complainant's petition for review at 40. It contends that the package licenses are intended to "enable a manufacturer" to make CD-R or CD-RW discs, and that the licenses provide manufacturers with the patents "need[ed] to manufacture the product." *Id.* at 40. It asserts that "[b]ecause each of the patents in the package covers aspects of a single product *and each is licensed for the limited purpose of making the product*, the package licensing of the patents does not extend their scope." *Id.* at 40 (emphasis in original). Complainant argues that the benefits of package licensing are recognized in section 5.5 of the DOJ/FTC Antitrust Guidelines and in the three Business Review Letters from the DOJ Antitrust Division involving package licensing. Respondents and the IA oppose complainant's position.

A leading treatise indeed characterizes *Landon* as "recogniz[ing] an exception to the *American Securit* rule against mandatory package licensing in the case of blocking patents." Donald S. Chisum, *Chisum on Patents* § 19.04 [3][c]. And the DOJ has also recognized in its business review letters that packaging blocking patents can be procompetitive:

> A starting point for an antitrust analysis of any patent pool is an inquiry into the validity of the patents and their relationship to each other. A licensing scheme premised on invalid or expired intellectual property rights will not withstand antitrust scrutiny. [footnote omitted] *And a patent pool that aggregates competitive technologies and sets a single price for them would raise serious competitive concerns. On the other hand, a combination of complementary intellectual property rights, especially ones that block the application for which they are jointly licensed, can be an efficient and procompetitive method of disseminating those rights to would-be users.*

CX-355 (MPEG-2 Business Review Letter) at 9 (emphasis added).

> If the [three] [l]icensors [participating in the pool] owned patent rights that could be licensed and used in competition with each other, they might have an economic incentive to utilize a patent pool to eliminate competition among them. A pool that served that purpose "would raise serious competitive concerns." [footnote omitted] In combining such substitute patents, the pool could serve as a price-fixing mechanism, ultimately raising the price of products and services that utilize the pooled patents. *If, on the other hand, the pool were to bring together complementary patent rights, it could be "an efficient and procompetitive method of disseminating those rights to would-be users."* [footnote omitted] By reducing what would otherwise be three licensing transactions to one, the pool would reduce transactions costs for [l]icensors and licensees alike. *By ensuring that each [l]icensor's patents will not be blocked by those of the other two, the pool would enhance the value of all three [l]icensors' patents.*

CX-357 (3C DVD Business Review Letter) at 9 (quoting MPEG-2 Business Review Letter (CX-355) at 9) (emphasis added); *accord* CX-358 (6C DVD Business Review Letter) at 9. Under the standard articulated by the *Landon* court,[FN37] however, neither the Farla '692 patent nor the Iwasaki '149 patent are in a blocking relationship with the other patents included in the pool.[FN38]

The DOJ business review letters also identify two anticompetitive effects arising from the inclusion in the pool of patents that are substitutes for one another. CX-358 at 10. The 6C DVD business review letter discusses the effects as follows:

> Consider, for example, a situation in which there are several patented methods for placing DVD-ROMs into packaging -- each a useful complement to DVD-ROM manufacturing technology, but not essential to the standard. A DVD-ROM maker would need to license only one of them; they would be substitutes for each other. Inclusion in the pool of two or more such patents would risk turning the pool into a price-fixing mechanism. Inclusion in the pool of only one of the competing nonessential patents, which the pool would convey along with the essential patents, could in certain cases unreasonably foreclose the non-included competing patents from use by manufacturers; because the manufacturers would obtain a license to the one patent with the pool, they might choose not to license any of the competing patents, even if they otherwise would regard the competitive patents as superior. Limiting a pool to essential patents ensures that neither of these concerns will arise; rivalry is foreclosed neither among patents within the pool nor between patents in the pool and patents outside it.

CX-358 (6C DVD Business Review Letter) at 10; *see also* CX-357 (3C DVD Business Review Letter) at 9; CX-355 (MPEG-2 Business Review Letter) at 9-10.

In this investigation, the ALJ found that a viable alternative technology exists *outside the pools* for the technology covered by some of the patents that are included in the pools, that is, at least one economically viable alternative exists to the Farla '692 patent that would comply with the requirements of the Orange Book and would not infringe the Farla '692 patent if it were used and at least one economically viable alternative exists to the Iwasaki '149 patent that would comply with the requirements of the Orange Book and would not infringe the Iwasaki '149 patent if it were used. Complainant asserts that there is no evidence that its licensees aren't using all of the patents included in the pools to manufacture the CD-R/RWs. Even if true, that fact does not obviate the competitive harm identified by the ALJ -- which is that alternative technologies that could be used to manufacture CD-R/RWs are "foreclosed" because licensee manufacturers are forced to take licenses to nonessential patents covering technology that competes with the alternative technology.

B. Certain So-Called "Essential" Patents Are Not Essential

Complainant also argues that the ALJ adopted an incorrect standard for evaluating "essentiality." It contends that the essentiality standard which it advanced (through the testimony of Dr. Rubenstein), and which was rejected by the ALJ, was approved by the DOJ Antitrust Division.

We do not find persuasive complainant's contention that the ALJ assumed, contrary to "uncontested evidence," that sections of the Orange Book labeled "recommendations and clarifications" are optional (complainant's submission at 111). Although complainant relies on the testimony of Dr. Rubenstein on this point, the ALJ considered Dr. Rubenstein's position but rejected it based on the testimony of respondents' expert (McLaughlin), complainant's witness (Mons), and the text of the Orange Book. *See, e.g.*, ID at 188-89, 205; Trans. (McLaughlin) at 1504:10-18, 1507:10-1509:17; Trans. (Mons) at 453:18-454:2; *see also* Trans. (McLaughlin) at 1504:19-1506:6; RX-407C (Orange Book CD-R Standard § 1.3 at PH015684); RX-408C (Orange Book CD-RW Standard § 1.3 at at PH023245).

We also disagree with complainant's characterization of the 6C DVD Business Review Letter as "noting that both 'optional or mandatory features of the standard' would be considered in determining essentiality." Complainant's submission at 106 (citing CX-358 § II.B). The language upon which complainant relies appears in connection with the allocation of royalties, not the determination of essentiality. CX-358 at 6. Complainant's position that a patent that is necessarily infringed by compliance with an optional portion of the standard is "technically essential" is not supported by the DOJ Business Review Letters.[FN39]

In the MPEG-LA business review letter, the DOJ stated that "[t]he limitation of the Portfolio [(*i.e.*, the patents in the package)] to technically essential patents, as opposed to merely advantageous ones, helps ensure that the Portfolio patents are not competitive with each other *and that the Portfolio license does not, by bundling in nonessential patents, foreclose the competitive implementation options that the MPEG-2 standard has expressly left open*." CX-355 at 10 (emphasis added). Later in the same letter, the DOJ explained that "conditioning of a license for one intellectual property right on the license of a second such right could be a concern where its effect was to foreclose competition from technological alternatives to the second. In this instance, however, the essentiality of the patents -- determined by the independent expert -- means that there is no technological alternative to any of them and that *the Portfolio license will not require licensees to accept or use any patent that is merely one way of implementing the MPEG-2 standard, to the detriment of competition*." CX-355 at 11 (emphasis added).

As explained in the ID --

> In the ... 3C DVD Business Review Letter, the patent pools in question were limited to "essential" patents that were defined somewhat more broadly from the MPEG-2 pool as being "necessary (as a practical matter) for compliance with the DVD[-Video or DVD-ROM] Standard Specifications." *See* CX-357 (3C DVD Business Review Letter at p. 3). The DOJ stated that it understood this definition "to encompass patents which are technically essential -- *i.e.* inevitably infringed by compliance with the specifications -- and those for which existing alternatives are economically unfeasible." *See id.* at 3 n.8.

ID at 143. The DOJ continued with this same approach in the 6C DVD Business Review Letter (CX-358), which is the letter cited by complainant. In that letter, the DOJ stated that, in the proposed licensing arrangement, a patent is "essential" "if it is '*necessarily infringed*,' *or* 'there is no realistic alternative' to it, 'in implementing the DVD Standard Specifications."'[FN40] CX-358 at 3 (quoting agreement at issue) (emphasis added).

The 6C DVD Business Review Letter also states that --

> [a]fter deducting its licensing-administrator fee, Toshiba will distribute the remaining royalties among the Licensors pursuant to an agreed allocation formula set forth in the Ground Rules for Royalty Allocation. This formula takes into account how often a Licensor's "essential" patents are infringed by either manufacture or sale of licensees' products, the age of the patents, and, in the case of patents "essential" to disc standards, whether the Licensor's patents relate to optional or mandatory features of the standard.

CX-358 at 6 (footnote omitted). Although the above-quoted statement indicates that a patent relating to "optional" features of the standard may be deemed "essential," it does *not* follow that a patent relating to "optional" features of the standard could be deemed "technically essential." This is because a patent is essential (1) if it is necessarily infringed by compliance with the standard (*i.e.*, technically essential) *or* (2) if there is no realistic alternative to it in implementing the standard (*i.e.*, necessary as a practical matter). Consistent with the concerns expressed by the DOJ in the MPEG-LA Business Review Letter quoted above, although a patent that relates to "optional" features of the standard may be deemed "essential," such a patent must be "necessary as a practical matter" -- and cannot be "technically essential."[FN41]

We disagree with complainant's assertion that the ALJ ignored the "essential as a practical matter" criterion. *See, e.g.*, ID at 142-43, 193. As stated by the ALJ (ID at 143), in approving the necessary as a practical matter standard in the 3C DVD Business Review Letter, the DOJ stated that this definition encompassed patents "for which existing alternatives are economically unfeasible." CX-357 at 3 n.8, 10 (no "economically viable substitutes"); *see also* CX-358 at 3, 10 (no "economically feasible alternatives"). Although respondents' expert (McLaughlin) testified that his essentiality analysis did not use "essentiality as a practical matter,"[FN42] that does not mean that the ALJ could not rely on McLaughlin's testimony that a particular alternative technology exists, is economically feasible, can be used to practice the Orange Book standard, and is not covered by a patent in applying the "essential as a practical matter" standard. *See, e.g.*, ID at 203-04 (finding that the Farla '692 patent has not been shown to be "essential as a practical matter"); ID at 205-06 (finding that the Iwasaki '149 patent is not essential as a practical matter).

C. The ALJ's Finding of Anticompetitive Effect Is Supported by the Evidence

The ALJ identified specific patents that were identified in complainant's licenses as so-called "essential" patents even though (1) the patent was not "technically essential" to practice the Orange Book, and (2) economically viable, alternative technology existed to that covered by the patent. He concluded that the inclusion of actually nonessential patents among the so-called "essential" patents unreasonably foreclosed competition. He found that alternative technologies that compete with the technology of those patents are unreasonably foreclosed from use by licensee manufacturers because the manufacturers are wedded to the nonessential patents that they are compelled by the pools to accept. ID at 196. Thus, the anticompetitive effect of the tying arrangement (*i.e.*, including actually nonessential patents in the list of so-called "essential" patents and requiring a licensee to take all of the so-called "essential" patents) is foreclosure of competition.

While not stated explicitly in the ID, the injury to competition occurs in the market for the "tied" patent, *viz.*, the technology licensing market for the actually nonessential patent (and substitute technology) that is included in the list of so-called "essential" patents. The foreclosure occurs because the ability of owners of competing technology to license their technology to CD-R/RW manufacturers is impaired by the requirement that the manufacturers license the nonessential patents, which is a disincentive for them to license alternative, substitute technologies for the nonessential patents. FF 177, 179, 454-456.

D. The ALJ Balanced the Pro-Competitive Effects

We do not find persuasive complainant's argument that the ALJ failed to consider the procompetitive effects of its licensing practices and weigh them against the anticompetitive effects. The ALJ considered the procompetitive effects advanced by complainant at several points in the ID.[FN43] ID at 192-94, 214-16, 219. He considered and rejected complainant's argument that its licensing practices created a new consumer product (CD-R/RWs) and a new industry. ID at 214-15. He regarded those benefits as flowing from the Orange Book standards. Complainant's argument -- that the ALJ's analysis is incorrect because a license is required to produce CD-R/RWs -- is misguided because (as complainant concedes in its submission at 131 n.83) all necessary patent rights could be obtained from individual licensors without a pool license. The ALJ considered and rejected complainant's contention that a broad package is convenient to manufacturers; he specifically found that the convenience to

manufacturers of a broad package of patents was outweighed by the anticompetitive effect on alternative technologies of packaging nonessential patents with essential patents. ID at 192-94.

For the foregoing reasons, we conclude that the patents asserted in this investigation are unenforceable for patent misuse under the rule of reason.

Thus, we have found the asserted patents unenforceable for patent misuse *per se* and have also found the asserted patents unenforceable for patent misuse under the rule of reason. We affirm the ALJ's conclusion that although patent misuse can be purged if the patent holder shows that he has completely abandoned the improper practices that were found to be misuse and that the consequences of the misuse have been fully dissipated, no such showing has been made by complainant in this investigation. ID at 146-47, 220; FF 602.

FN1. *See* ALJ Order No. 6 (an unreviewed ID terminating eight respondents on the basis of a consent order); ALJ Order No. 17 (an unreviewed ID terminating three respondents on the basis of a consent order and settlement agreement); ALJ Order No. 18 (an unreviewed ID terminating one respondent on the basis of a consent order and settlement agreement); and ALJ Order No. 21 (an unreviewed ID finding four respondents in default).

FN2. The technical standards for the manufacture of CD-Rs and CD-RWs are set out in two publications that are jointly issued by Philips and Sony Corporation ("Sony"). "Compact Disc Recordable System Description" (RX-407C), which is commonly referred to as Part II of the Orange Book, pertains to CD-Rs. "Compact Disc ReWritable System Description" (RX-408C), which is commonly referred to as Part III of the Orange Book, pertains to CD-RWs. ID at 139-40.

FN3. We take no position on the ALJ's conclusion that the asserted patents are unenforceable for patent misuse *per se* based on theories of price fixing and price discrimination.

FN4. We take no position on the ALJ's conclusion that the royalty rate structure of the CD-R/RW patent pools is an unreasonable restraint of trade, but adopt those portions of the ALJ's analysis of the royalty rate mechanism under the rule of reason (ID at 213-19) that are relevant to the issue of whether the anticompetitive effects of including nonessential patents in the list of so-called essential patents outweigh the procompetitive effects.

FN5. As to the proposed licensing arrangement that was alleged to constitute patent misuse in *Virginia Panel*, the court stated that the patentee's "proposal to the [prospective licensee] was not a consummated tying arrangement and for that reason was not *per se* patent misuse." 133 F.3d at 871. The Federal Circuit explained that, unlike the tying cases on which defendant-appellant relied, the patentee and prospective licensee "never entered into any license agreement that required [the prospective licensee] to purchase unpatented, staple goods. *See* 35 U.S.C. § 271(d)(5) (by implication, limiting tying arrangements to the conditioning of an actual license or sale of the patented product)." 133 F.3d at 871. Having determined that the license proposal at issue was not *per se* patent misuse as a tying arrangement, the court went on to that portion of the misuse analysis outlined *supra* that could lead to a rule of reason inquiry: "Furthermore, because [the patentee], on the advice of counsel, voluntarily and unilaterally revoked the proposal to link the license to the purchase of unpatented items, [the patentee's] activities did not extend the scope of its patent rights. Accordingly, we conclude that [the patentee's] truncated negotiations with [the prospective licensee] did not constitute patent misuse." 133 F.3d 871.

FN6. *The American College Dictionary* 1356 (Random House 1970) ("view ... 17. in view of, a. in sight of. b. in prospect or anticipation of. c. in consideration of. d. on account of").

FN7. As respondents note, where the intent of a statute is to overrule prior common law, that statutory purpose must be clear. *United States v. Texas*, 507 U.S. 529, 534 (1993). Such is not the case here.

FN8. We also do not rely on the ALJ's discussion of the legislative history of section 271(d)(5) set forth in the ID at 150.

FN9. Complainant's submission at 47 (relying on *Windsurfing International, Inc. v. AMF, Inc.*, 782 F.2d 995, 1001 (Fed. Cir. 1986) ("[t]o sustain a misuse defense involving a licensing arrangement not held to have been per se anticompetitive by the Supreme Court, a factual determination must reveal that the overall effect of the license tends to restrain competition unlawfully in an appropriately defined relevant market" (footnote omitted)).

FN10. "Block-booking is the practice of licensing, or offering for license, one feature [film] or group of features on condition that the exhibitor will also license another feature or group of features released by the distributors during a given period." *United States v. Paramount Pictures, Inc.*, 334 U.S. 131, 156 (1948).

FN11. Complainant cites no authority for the proposition that tying is "inherent" in a pool license (Complainant's submission at 47). The DOJ Antitrust Division MPEG-2 business review letter states that --

> [a]lthough it offers the Portfolio patents [*viz.*, the patents identified as essential to compliance with the video and/or systems parts of the MPEG-2 standard] only as a package, the Portfolio license does not appear to be an illegal tying agreement. The conditioning of a license for one intellectual property right on the license of a second such right could be a concern where its effect was to foreclose competition from technological alternatives to the second. In this instance, however, the essentiality of the patents -- determined by the independent expert -- means that there is no technological alternative to any of them and that the Portfolio license will not require licensees to accept or use any patent that is merely one way of implementing the MPEG-2 standard, to the detriment of competition. *Moreover, although a licensee cannot obtain fewer than all the Portfolio patents from MPEG LA, the Portfolio license informs potential licensees that licenses on all the Portfolio patents are available individually from their owners or assignees. While the independent expert mechanism should ensure that the Portfolio will never contain any unnecessary patents, the independent availability of each Portfolio patent is a valuable failsafe.*

CX-355 at 11 (emphasis added).

FN12. The principal objective of the U.S. patent system is the promotion of the progress of science and the useful arts. *U.S. Const.* art. I, § 8; *U.S. v. Masonite Corp.*, 316 U.S. 265, 278 (1942). The suppression of emerging technology is directly contrary to that purpose.

FN13. This was accomplished through an implied license. 448 U.S. at 186, 202.

FN14. *Dawson* was decided prior to the Patent Misuse Reform Act of 1988, which enacted 35 U.S.C. §§ 271(d)(4), (5).

FN15. In discussing the first prong of the *Senza-Gel* analysis, *viz.*, "whether [the tied] product is a necessary concomitant of the invention or an entirely separate product" (803 F.2d at 670 n.14), complainant cites an unpublished Federal Circuit opinion (*Ricoh Co. v. Nashua Corp.*, 1999 WL 88969); *Broadcast Music Inc. v. Columbia Broadcasting System, Inc.*, 441 U.S. 1, 21 (1979); *Texas Instruments, Inc. v. Hyundai Electronics Industries Co.*, 49 F. Supp.2d 893, 913, 915 (E.D. Tex. 1999); and *Milliken Research Corp. v. Dan River, Inc.*, 739 F.2d 587, 594 (Fed. Cir. 1984). *Broadcast Music* is inapposite because, not only is it an antitrust case, it is not even an antitrust *tying* case. The district court opinion in *Texas Instruments* is not binding precedent on the Commission. As discussed in Part A, *supra*, we disagree with the district court's conclusion that the enactment of 35 U.S.C. § 271(d)(5) in the Patent Misuse Reform Act of 1988 eliminated the *per se* approach to patent tie-ins. We also disagree with the district court's conclusion that *Senza-Gel* has "limited, if any, significance after the Patent Misuse Reform Act of 1988." 49 F.Supp.2d at 915. The district court perceived an inconsistency between the language of section 271(d)(5), which refers to "condition[ing] the license of any rights to the patent or the sale of the patented product on the acquisition of a license to rights in another patent or purchase of a *separate product*," 49 F.Supp.2d at 914 (quoting 35 U.S.C. § 271(d)(5) (emphasis added by district court)), and the reference to "separable or inseparable items" in *Senza-Gel*, 803 F.2d at 664. The district court's reliance on this difference in language is problematic given the statement in *Senza-Gel* that "[t]he law of patent misuse in licensing ... need look only to the nature of the claimed invention as the basis for determining whether a product is a necessary concomitant of the invention or an *entirely separate product*." 803 F.2d at 670 n.14 (emphasis added).

FN16. The Ninth Circuit went on to state that "[t]he evil of mandatory package licensing in [*Shatterproof Glass*] was that the

prospective licensee, in order to obtain a license under one patent, would be compelled to accept licenses under patents that were not necessarily needed. The same evil does not arise in mandatory package licensing of blocking patents. In such a case, the prospective licensee is being compelled to accept no more than he would, in any event, have to obtain in order to make worthwhile a license under any of the patents." 336 F.2d at 729-30.

FN17. Because the essentiality of four of the six patents asserted in this investigation has not been challenged, those four patents (*viz.*, the '401 patent, the '856 patent, the '825 patent, and the '764 patent) are among the "tying" patents. The parties dispute whether two of the asserted patents (the Kramer '493 and the Kramer '209 patents) are essential. Either the Kramer patents are properly deemed "essential" or they are actually nonessential patents that should not have been included in the list of so-called essential patents. If the former, they are "tying" patents; if the latter, "tied" patents. In either case, the Kramer '493 and '209 patents are part of the tying arrangement, and therefore both patents should be found unenforceable for patent misuse.

FN18. The ALJ found that the patents identified by the licensors as so-called "essential" patents have changed over time. *See, e.g.*, FF 104-06. He further found that some licensees are operating under license agreements that include nonessential patents. FF 78. The burden of demonstrating a purge of patent misuse rests on complainant and requires, *inter alia*, that licenses containing improper provisions must have expired, or at least that the improper provisions be removed. ID at 147 (citing cases).

FN19. We take no position on the ID's statement that "Philips, Sony, Taiyo Yuden, and Ricoh are horizontal competitors in the patent licensing market" (ID at 173), and also take no position on the statement that "the Philips CD-R and CD-RW patent pools constitute horizontal agreements among competitors" to control royalty rates (ID at 175).

FN20. We disagree with complainant's contention that in excluding recordable/rewritable DVDs from the relevant product market, the ALJ shifted the burden of proof to complainant. Respondents' expert (Bratic) testified that recordable DVDs are not reasonably interchangeable with CD-Rs. Trans. (Bratic) at 1698:20-1701:2. He noted that a recordable DVD would not play in a CD player and that consumers typically paid ten times more for DVD players than for CD players. The ALJ could reasonably reject the conflicting opinion of complainant's expert (McCarthy) that DVDs were interchangeable with CD-R/RWs, and in the ID he explained his reasons for doing so. Thus, the burden of proof on this issue was not shifted to complainant.

Complainant asserts that Bratic was qualified by the ALJ over its objection "on the issue of patent misuse." Complainant's submission at 61 n.38 (quoting Trans. at 1620). The ALJ stated as follows:

> I will accept Mr. Bratic as an expert in licensing practices and economic matters that pertain to licensing, and facts which indicate to him misuse. Now, I don't accept that as binding on me in any way or on the Commission in any way as to what the law is on misuse, but merely the opinion of a person who has had a lot of experience, obviously, in his views on what the market considers to be regular and normal and what appears to be abnormal.

Trans. at 1623:3-11; *see generally* 1620:1-1624:18. Complainant also asserts that "Bratic, an accountant, not an economist, has never before testified or been qualified to testify about relevant market definitions, market power or anticompetitive effects in relevant markets. (Bratic Tr. 1908-09.) For these and other reasons, Mr. Bratic was not qualified to testify on the definition of a relevant market, and it was error for the ALJ to adopt in whole Mr. Bratic's testimony." Complainant's submission at 61. Bratic testified that he had "testified on relevant markets and market definitions in many patent cases" (Trans. at 1909:13-14), and that he had "also testified on price erosion issues and the effects of anticompetitive behavior as they relate to price erosion in patent infringement matters" (Trans. (Bratic) at 1911:18-20). *See* Trans. (Bratic) at 1908-13;1610-19 (educational background and work experience).

FN21. *Accord* CX-422C at 2 ("CD-RW Disc License Agreement" with[[* * *]](Dec. 21, 1999)); Philips' complaint appendix N, tab 10 ("CD-RW Disc Agreement" with [[* * *]](Feb. 12, 1999)); CX-420 C at 2 ("CD-RW Disc License Agreement" with Gigastorage Corporation (Oct. 12, 1999)); *see also* CX-412C at 2 ("CD-RW Recorder Agreement" with[[* * *]](Feb. 12, 1999) ("WHEREAS, Licensee understands, that Philips is willing to license *any one or more patent rights* owned or controlled by Philips for optical recording equipment manufacturing, whether within or outside of the CD-RW Standard Specifications as defined hereinafter and to disclose and make available the requested basic information, all on reasonable terms and conditions") (emphasis added).

FN22. Appendix N is entitled "License Agreements of CD-RW Licensees." Tab 1 is "CD-RW Disc Patent License Agreement"

with[[* * *]](June 17, 2000). Tab 7 is "CD-RW Disc Patent License Agreement" with[[* * *]](July 1, 2000). Tab 16 is "CD-RW Disc Patent License Agreement" with[[* * *]](June 16, 2000). Tab 17 is "CD-RW Disc Patent License Agreement" with[[* * *]](June 21, 2000). Tab 18 is "CD-RW Disc Patent License Agreement" with[[* * *]](Sept. 25, 2000).

FN23. In support of its argument that it "is willing to negotiate licenses under whatever patent a licensee chooses" (Complainant's submission on review at 81), complainant also cites the following hearing testimony of Brian Wieghaus, complainant's general manager of optical licensing in North America:

> Q: What is Philips's policy with respect to offering its patents for use other than in the field of use of a joint licensing program?
> A: Essentially, it's negotiable.
> Q: What is Philips's policy with respect to offering individual patents for license?
> A: Again, it's negotiable.

Trans. at 305. However, the testimony of Wieghaus that precedes the above-quoted excerpt concerns unusual nonstandard optical products in niche fields. Trans. (Wieghaus) at 303-05. Thus, rather than being directed to licensing patents for use in implementing the CD-R/RW standard, the question relates to negotiations for the use of patents in such non-standard fields. The Wieghaus testimony therefore provides no support for complainant's contention that prospective CD-R/RW manufacturer licensees had the option of obtaining licenses to individual patents.

FN24. ID at 201-05. The ALJ found that the Farla '692 patent "was included in the CD-R license agreement for many years before it was removed from the list of essential patents in 2001." ID at 204 (citing RX-840, RX-778, RX-755, RX-914). He also found that "at least as of a license agreement signed in January 2002, the Farla '692 patent was still being listed as an essential patent under the CD-RW license agreement." ID at 204 (citing RX-770 at PH087634). As pointed out by the IA, the following additional CD-RW licenses also include the Farla '692 patent: RX-766 at PH087728, RX-773 at PH088934.

FN25. As discussed in Part C, *supra*, the mandatory package licensing of blocking patents is not patent misuse *per se* because such patents may be considered to be a single product. As the Ninth Circuit stated in *International Manufacturing Co. v. Landon, Inc.*, 336 F.2d 723, 731 (9th Cir. 1964), "where the licensee could produce a commercially acceptable product utilizing one patent but not infringing the others in the package, then clearly we would not have a case involving blocking patents."

FN26. Respondents assert that in appendix B of complainant's submission on review, complainant for the first time challenges the opinion of its expert (McLaughlin) as to the essentiality of specific patents, raising arguments that were never presented to the ALJ. Respondents concede, however, that the appendix also "discusses factual or legal issues that may have been raised before the ALJ." Respondents' reply at 78. The Commission need not consider arguments raised by complainant in appendix B of its submission on review challenging the patent-by-patent essentiality opinion testimony of respondents' expert that were not raised before the ALJ. *Hazani v. United States Int'l Trade Comm'n*, 126 F.3d 1473, 1476-77 (Fed. Cir. 1997). However, as discussed below, the Commission finds complainant's arguments unpersuasive.

FN27. Calimetrics is a company owning alternative technology. *See, e.g.*, ID at 203.

FN28. We do not decide whether the Spruit '351 patent, the Hamada '388 or '009 patents, the Lagadec '565 patent, the Ogawa '994 patent, the Kramer '493 or '209 patents, or the Mimnagh '462 patent are "separate" from the tying patents.

FN29. General challenges to the testimony of respondents' expert (McLaughlin) raised by complainant are discussed *supra* in connection with our discussion of the Farla '692 patent.

FN30. Complainant's references to CX-163C at PH015771 (B12.1 - 12.3 of attachment B12 of part II of the Orange Book (CD-R)) and CX-162C at PH023341 (C9.1 - 9.3 of attachment C9 of part III of the Orange Book (CD-RW)) are inconsistent with the cited portion of Rubenstein's status report (RX-126C at PH065726), which identifies attachments B1 and C1.1 as relevant to the Lockhoff '219 patent and which also identifies attachments B12-1, B12-2, C9-1, and C9-2 as relevant to U.S. Patent No. 5,428,598.

FN31. Arguments raised by complainant in its submissions concerning the ALJ's analysis of the Farla '692 patent, the Lockhoff '219 patent, the Yamamoto '719 patent, and the Iwasaki '149 patent are addressed *supra*.

FN32. We adopt those portions of the ALJ's analysis of the royalty rate mechanism under the rule of reason (ID at 213-19) that are relevant to the issue of whether the anticompetitive effects of including nonessential patents in the list of so-called essential patents outweigh the procompetitive effects, *e.g.*, ID at 214-15 (attributing the development of CD-R and CD-RW consumer market to standardization), ID at 215-16 (acknowledging well-recognized procompetitive effects of pools that license technically essential patents, but identifying inherent competitive problems posed by pools that encompass nonessential patents); ID at 217-18 (discussing separate lists of essential and nonessential patents that are under control of Philips and its licensor partners and are not negotiable); ID at 219 ("Efforts on the part of pool members to have their patents included in the pool as 'essential as a practical matter,' even though those patents do not cover anything in the Orange Book, [are] merely an attempt to forestall competing technologies").

FN33. *See also* Robert J. Hoerner, "The Decline (and Fall?) Of the Patent Misuse Doctrine in the Federal Circuit," 69 *Antitrust Law Journal* 669 (2002), discussing inconsistency between Federal Circuit cases and those cited by respondents.

FN34. We address the question of whether 35 U.S.C. § 271(d)(5) eliminated the *per se* approach to patent tie-ins in section I.A. *supra*.

FN35. We reject complainant's contention that *Shatterproof* is "directly contrary" to *Broadcast Music*. As pointed out by the ALJ (ID at 182 n.111), *Broadcast Music* did not involve mandatory package licensing.

FN36. Complainant points out that the *Landon* court stated that "it is not an unlawful tying arrangement for a seller to include several items in a single mandatory package when the items may be reasonably considered to constitute parts of a single distinct product," and that "[t]he product ... is no less a single product because its novel aspects are disclosed by two interlocking patents. In such a case, not only is it not unreasonable to treat both patents as constituting a single product, but also licensing them in a package deal appears to be the most practical way of making them available for public use." Complainant's petition for review at 40-41 (quoting 336 F.2d at 730).

FN37. "If we had a case where the licensee could produce a commercially acceptable product utilizing one patent but not infringing the others in the package, then clearly we would not have a case involving blocking patents." 336 F.2d at 731.

FN38. The ALJ found that at least one economically viable alternative exists to the Farla '692 patent that would comply with the requirements of the Orange Book and would not infringe the Farla '692 patent if it were used and that at least one economically viable alternative exists to the Iwasaki '149 patent that would comply with the requirements of the Orange Book and would not infringe the Iwasaki '149 patent if it were used. ID at 203-06.

FN39. According to Dr. Rubenstein, "essential" patents include those that are either (1) "technically essential" or (2) "essential as a practical matter" (also referred to by Dr. Rubenstein as "commercially essential"). In determining whether a patent is "essential as a practical matter," Dr. Rubenstein considers whether alternative technology exists -- but he does not consider the existence of alternative technology in deciding whether a patent is "technically essential." Complainant's submission at 104-05 ("Dr. Rubenstein does not consider whether there are any alternatives to technically essential patents"), 107 (Trans. (Rubenstein) at 2185-86).

> The ALJ recognized that a "technically essential" patent is one that is "inevitably infringed by compliance with the specification." *E.g.*, ID at 189. He also recognized, however, that "if the manufacturer practices a methodology that is identified in the Orange Book as an 'alternative' or 'optional' methodology that is *not* covered by any patent in the pool, a manufacturer utilizing such optional technology would be in technical compliance with the Orange Book and would not be an infringer [of any patent in the pool]." ID at 189.

FN40. The DOJ letter goes on to note that the definition of "essential" in the proposed licensing arrangement -- introduces some uncertainty. By asking the expert to identify not only those patents that are literally essential to compliance with the DVD-ROM and DVD-Video standards, but also those for which there is no "realistic" alternative, the definition introduces a degree of subjectivity into the selection process. Based on your representations, however, it appears that the expert will interpret "realistic" to mean economically feasible.
CX-358 at 10.

FN41. To allow a patent that relates to "optional" features of the standard to be deemed "technically essential" because the patent is necessarily infringed by compliance with the optional features of the standard (even if the patent is not infringed by practice of the mandatory portions of the standard) would foreclose alternative competitive implementation options that the standard has expressly left open.

FN42. Trans. (McLaughlin) at 1558:17-1559:4.

FN43. As noted *supra* in footnote 32, we have adopted those portions of the ALJ's analysis of the royalty rate mechanism under the rule of reason (ID at 213-19) that are relevant to the rule of reason balancing of the procompetitive effects against the anticompetitive effects of including nonessential patents in the list of so-called essential patents.

NOTICE OF COMMISSION DECISION TO REVIEW PORTIONS OF AN INITIAL DETERMINATION FINDING NO VIOLATION OF SECTION 337 OF THE TARIFF ACT OF 1930

AGENCY: U.S. International Trade Commission.
ACTION: Notice.
SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to review portions of the presiding administrative law judge's ("ALJ's") final initial determination ("ID") and to affirm ALJ Order No. 32.

FOR FURTHER INFORMATION CONTACT: Clara Kuehn, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3012. Copies of the public version of the ALJ's final ID and all other nonconfidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (*http://www.usitc.gov*). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on July 26, 2002, based on a complaint filed by U.S. Philips Corporation of Tarrytown, NY ("Philips" or "complainant"). 67 *Fed. Reg.* 48,948 (2002). The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930 in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain recordable compact discs and rewritable compact discs by reason of infringement of certain claims of six U.S. patents: claims 1, 5, and 6 of U.S. Patent No. 4,807,209; claim 11 of U.S. Patent No. 4,962,493; claims 1, 2, and 3 of U.S. Patent No. 4,972,401; claims 1, 3, and 4 of U.S. Patent No. 5,023,856; claims 1-5, and 6 of U.S. Patent No. 4,999,825; and claims 20, 23-33, and 34 of U.S. Patent No. 5,418,764. 67 *Fed. Reg.* 48,948 (2002).

The notice of investigation named 19 respondents, including GigaStorage Corporation Taiwan of Hsinchu, Taiwan; GigaStorage Corporation USA of Livermore, California (collectively, "GigaStorage"); and Linberg Enterprise Inc. ("Linberg") of West Orange, New Jersey. 67 *Fed. Reg.* 48,948 (2002). On August 14, 2002, the ALJ issued an ID (Order No. 2) granting a motion to intervene as respondents by Princo Corporation of Hsin-Chu, Taiwan, and Princo America Corporation of Fremont, California (collectively, "Princo"). That ID was not reviewed by the Commission. GigaStorage, Linberg, and Princo ("respondents") are the only remaining active respondents in this investigation. *See* ALJ Order No. 6 (an unreviewed ID terminating eight res-

pondents on the basis of a consent order); ALJ Order No. 17 (an unreviewed ID terminating each of three respondents on the basis of a consent order and settlement agreement); ALJ Order No. 18 (an unreviewed ID terminating one respondent on the basis of a consent order and settlement agreement); and ALJ Order No. 21 (an unreviewed ID finding four respondents in default).

On April 7, 2003, the ALJ issued an ID (ALJ Order No. 20) granting complainant's unopposed motion for summary determination that Linberg, GigaStorage, and Princo have each sold for importation, imported, and/or sold after importation products accused of infringing one or more of the asserted patent claims. That ID was not reviewed by the Commission.

A tutorial session was held on June 3, 2003, and an evidentiary hearing was held from June 10, 2003, through June 20, 2003.

On June 30, 2003, the ALJ issued an order (ALJ Order No. 32) granting a motion *in limine* filed by respondents to preclude complainant from asserting the doctrine of unclean hands with respect to respondents' affirmative defense of patent misuse.

The ALJ issued his final ID on October 24, 2003. Although he found that none of the asserted claims are invalid, that the accused products infringe the asserted claims, and that the domestic industry requirement of section 337 has been satisfied, he found no violation of section 337 because he concluded that all of the asserted patents are unenforceable by reason of patent misuse.

On November 5, 2003, complainant Philips petitioned for review of the portion of the final ID that found the asserted patents unenforceable due to patent misuse, and also appealed ALJ Order No. 32. On the same day, respondents filed a paper entitled "Statement of Respondents Princo Corp., Princo America Corp., Gigastorage Corp. Taiwan, Gigastorage Corp. USA, and Linberg Enterprises, Inc. Regarding the Initial Determination," in which respondents urged the Commission to adopt the ID in its entirety. Respondents and the IA filed responses to complainant's petition for review.

On December 8, 2003, the ALJ issued his recommended determination on remedy and bonding.

Having reviewed the record in this investigation, including the parties' written submissions, the Commission determined to affirm ALJ Order No. 32 and to review the ID's findings of fact and conclusions of law concerning patent misuse. The Commission has determined not to review the remainder of the ID, including the findings of fact and conclusions on the issues of infringement and invalidity of the asserted claims and the domestic industry requirement of section 337.

In connection with the final disposition of this investigation, the Commission may issue (1) an order that could result in the exclusion of the subject articles from entry into the United States, and/or (2) cease and desist orders that could result in respondents being required to cease and desist from engaging in unfair acts in the importation and sale of such articles. Accordingly, the Commission is interested in receiving written submissions that address the form of remedy, if any, that should be ordered. If a party seeks exclusion of an article from entry into the United States for purposes other than entry for consumption, the party should so indicate and provide information establishing that activities involving other types of entry either are adversely affecting it or are likely to do so. For background information, see the Commission Opinion, *In the Matter of Certain Devices for Connecting Computers via Telephone Lines*, Inv. No. 337-TA-360.

If the Commission contemplates some form of remedy, it must consider the effects of that remedy upon the public interest. The factors the Commission will consider include the effect that an exclusion order and/or cease and desist orders would have on (1) the public health and welfare, (2) competitive conditions in the U.S. economy, (3) U.S. production of articles that are like or directly competitive with those that are subject to investigation, and (4) U.S. consumers. The Commission is therefore interested in receiving written submissions that address the aforementioned public interest factors in the context of this investigation.

If the Commission orders some form of remedy, the President has 60 days to approve or disapprove the Commission's action. During this period, the subject articles would be entitled to enter the United States under a bond, in an amount to be determined

by the Commission and prescribed by the Secretary of the Treasury. The Commission is therefore interested in receiving submissions concerning the amount of the bond that should be imposed.

WRITTEN SUBMISSIONS: The parties to the investigation are requested to file written submissions on the issues under review. The submission should be concise and thoroughly referenced to the record in this investigation, including references to exhibits and testimony. Additionally, the parties to the investigation, interested government agencies, and any other interested persons are encouraged to file written submissions on the issues of remedy, the public interest, and bonding. Such submissions should address the ALJ's December 8, 2003, recommended determination on remedy and bonding. Complainant and the Commission investigative attorney are also requested to submit proposed remedial orders for the Commission's consideration. The written submissions and proposed remedial orders must be filed no later than the close of business on January 9, 2004. Reply submissions must be filed no later than the close of business on January 16, 2004. No further submissions will be permitted unless otherwise ordered by the Commission.

Persons filing written submissions must file with the Office of the Secretary the original and 14 true copies thereof on or before the deadlines stated above. Any person desiring to submit a document (or portion thereof) to the Commission in confidence must request confidential treatment unless the information has already been granted such treatment during the proceedings. All such requests should be directed to the Secretary of the Commission and must include a full statement of the reasons why the Commission should grant such treatment. *See* 19 C.F.R § 201.6. Documents for which confidential treatment is granted by the Commission will be treated accordingly. All nonconfidential written submissions will be available for public inspection at the Office of the Secretary.

This action is taken under the authority of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in sections 210.42 - .45 of the Commission's Rules of Practice and Procedure (19 C.F.R. §§ 210.42 - .45).

By order of the Commission.

Marilyn R. Abbott

Secretary

PUBLIC VERSION

INITIAL DETERMINATION

Administrative Law Judge Sidney Harris

Pursuant to the Notice of Investigation, 67 Fed. Reg. 48948 (2002), this is the Administrative Law Judge's Initial Determination in the Matter of Certain Recordable Compact Discs and Rewritable Compact Discs Containing Same, United States International Trade Commission Investigation No. 337-TA-474. 19 C.F.R. § 210.42(a).

The Administrative Law Judge hereby determines that no violation of section 337 of the Tariff Act of 1930, as amended, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain recordable compact discs or rewritable compact discs by reason of infringement of claims 1, 5, or 6 of U.S. Letters Patent 4,807,209, claim 11 of U.S. Letters Patent 4,962,493, claims 1, 2, or 3 of U.S. Letters Patent 4,972,401, claims 1, 3, or 4 of U.S. Letters Patent 5,023,856, claims 1-5 or 6 of U.S. Letters Patent 4,999,825, or claims 20, 23-33, or 34 of U.S. Letters Patent 5,418,764.

TABLE OF CONTENTS

Opinion

Findings of Fact

The following abbreviations may be used in this Initial Determination:

ALJ	-	Administrative Law Judge
ALJX	-	Administrative Law Judge Exhibit
CDX	-	Complainants' Demonstrative Exhibit

CPX	-	Complainant's Physical Exhibit
CX	-	Complainant's Exhibit
Dep.	-	Deposition
EDIS	-	Electronic Document Imaging System
FF	-	Finding(s) of Fact
JPX	-	Joint Physical Exhibit
JX	-	Joint Exhibit
PCL	-	Proposed Conclusion of Law (CPCL, RPCL or SPCL)
PFF	-	Proposed FF (CPFF, RPFF or SPFF)
PRF	-	Proposed Reply or Rebuttal Finding (CPRF, RPRF or SPRF)
RDX	-	Respondents' Demonstrative Exhibit
RPX	-	Respondents' Physical Exhibit
RX	-	Respondents' Exhibit

SX	-	Commission Investigative Staff Exhibit
Tr.	-	Transcript.

I. BACKGROUND

A. Institution and Procedural History of This Investigation

On July 26, 2002, by publication of a Notice of Investigation in the *Federal Register*, this investigation was instituted, pursuant to subsection (b) of section 337 of the Tariff Act of 1930, as amended, to determine:

> [W]hether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain recordable compact discs or rewritable compact discs by reason of infringement of claims 1, 5, or 6 of U.S. Letters Patent 4,807,209, claim 11 of U.S. Letters Patent 4,962,493, claims 1, 2, or 3 of U.S. Letters Patent 4,972,401, claims 1, 3, or 4 of U.S. Letters Patent 5,023,856, claims 1-5 or 6 of U.S. Letters Patent 4,999,825, or claims 20, 23-33, or 34 of U.S. Letters Patent 5,418,764, and whether there exists an industry in the United States as required by subsection (a)(2) of section 337.

67 Fed. Reg. 48948 (2002).

The complainant is: U.S. Philips Corporation of Tarrytown, New York.[FN1] *Id.*

The respondents named in the Notice of Investigation are:

> Acme Production Industries of Kowloon, Hong Kong;
> Bregusa Micro International LLC of Lake Forest, California;
> Digital Storage Technology Co., Ltd. of Taipei Hsien, Taiwan;
> DiscsDirect.Com of Campbell, California;
> Gigastorage Corporation Taiwan of Hsinchu Industrial Park, Hsinchu, Taiwan ("Gigastorage Taiwan" or "Gigastorage");
> Gigastorage Corporation USA of Livermore, California ("Gigastorage USA" or "Gigastorage");
> Jacsonic Group of San Gabriel, California;
> J&E Enterprises, Inc. of Sun Valley, California;
> KingPro Mediatek Inc. of Tainan Hsien, Taiwan;
> Linberg Enterprise Inc. of West Orange, New Jersey;
> NewEgg.Com, Inc. of La Puenta, California;
> PNY Technologies, Inc. of Parsippany, New Jersey;
> QTC Computer Systems, Inc. of Santa Ana, California;
> STI Certified Products, Inc. of Fremont, California;
> Symmetry Group, Inc. of Long Island City, New York;
> Tiger Direct, Inc. of Miami, Florida;
> TKO Media Inc. of El Monte, California;
> U.S. DigitalMedia, Inc. of Phoenix, Arizona; and
> Xtraplus Corporation of Newark, California.

Id.

Additional respondents were added through their intervention, namely Princo Corporation of Hsin-Chu, Taiwan ("Princo Taiwan") and Princo America Corporation of Fremont, California ("Princo America") (collectively or individually, Princo Taiwan and Princo America may be referred to as "Princo"). *See* Order No. 2 (Initial Determination); Commission Notice Not to Review (Aug. 30, 2002).

All respondents other than Princo Taiwan, Princo America, Gigastorage Taiwan, Gigastorage USA and Linberg, have settled with Complainant or have been found to be in default.[FN2] *See* Order No. 6 (Initial Determination), Commission Notice Not to Review (Nov. 25, 2002); Order No. 17 (Initial Determination), Commission Notice Not to Review (Apr. 24, 2003); Order No. 18 (Initial Determination), Commission Notice Not to Review (Apr. 25, 2003); Order No. 21 (Initial Determination), Commission Notice Not to Review (May 7, 2003).

On October 28, 2002, early in the investigation, a change of investigative attorney was made by the Office of Unfair Import Investigations ("OUII"), and Rett V. Snotherly, Esq. has served as the investigative attorney since that time. *See* Notice of Change of Commission Investigative Attorney (Oct. 28, 2002).

On April 9, 2003, Philips filed its Motion for Sanctions against Respondents. Motion Docket No. 474-38. Philips argued that Respondents refused to provide discovery that they had agreed to provide, had failed to answer numerous interrogatories and document requests, and had not conducted appropriate searches. Philips requested that the Administrative Law Judge make certain inferences of infringement, preclude related arguments and evidence from being offered by Respondents, and require Respondents to pay Philips' costs related to the alleged refusal to produce documents and the costs associated with the pending Motion. Respondents opposed Philips' Motion. The Commission Investigative Staff supported Philips' Motion with respect to certain attorneys' fees. The Staff opposed all other sanctions requested by Philips, arguing, among other things, that it is not clear whether some of the allegedly withheld discovery had been compelled, which is required by 19 C.F.R. § 210.33 for the imposition of sanctions.

Having reviewed the evidence offered by the parties in this investigation, and the post-hearing briefs filed by the parties, the Administrative Law Judge finds that the sanctions requested in Philips' Motion are not appropriate, and that the relevant issues may be resolved without delay despite the alleged failure of Respondents to provide the discovery at issue or to provide the discovery in a timely manner. Nor is it clear that Respondents have engaged in improper conduct that has appreciably increased the costs of this litigation. Consequently, Philips' Motion for Sanctions is DENIED.

On April 22, 2003, Respondents filed their Motion for Sanctions directed against Philips. Motion Docket No. 474-41. Respondents sought evidentiary sanctions against Philips for allegedly failing to comply with Order No. 8 and Order No. 11, compelling certain discovery. The Motion was opposed by Philips and the Commission Investigative Staff.

On May 19, 2003, the Administrative Law Judge issued Order No. 25, requiring Philips to produce certain additional discovery immediately, denying in part Respondents' Motion for Sanctions, and deferring a complete ruling on the Motion until after the evidentiary hearing on the question of violation of section 337.

Having reviewed the evidence of record, and the parties' post-hearing briefs, the Administrative Law Judge finds that the sanctions requested in Respondents' Motion are not appropriate, and that the relevant issues may be resolved without delay despite the alleged failure of Philips to comply with discovery Orders. Consequently, Respondents' Motion for Sanctions is DENIED.

On June 10, 2003, Respondents filed their "Stipulation and Statement of Non-Opposition of Respondents Princo Corp., Prince America Corp., Gigastorage Corp. Taiwan, Gigastorage Corp USA, and Linberg Enterprises, Inc. to Satisfaction by Complainant U.S. Philips Corp. of the Domestic Industry Requirement" ("Stipulation and Statement"). EDIS No. 185077.

On June 3, 2003, a tutorial session was held, followed by a pre-hearing conference. *See* Tr. 1-120 (tutorial), 121-155 (pre-hearing conference).[FN3]

On June 10, 2003, another prehearing conference was held. *See* Tr. 156-204. The hearing on the question of violation of section 337 also commenced on June 10, 2003. The hearing concluded on June 20, 2003.[FN4] *See* Tr. 205-2649.

Post-hearing briefing commenced on July 14, 2003, and concluded on July 22, 2003. The parties have submitted main and reply

briefs, as well as proposed findings.[FN5] The issues are ripe for determination.

B. The Products at Issue

The products at issue in this investigation are recordable compact discs ("CD-Rs") and rewritable compact discs ("CD-RWs"). CD-Rs and CD-RWs are disc-shaped media used for data storage. Mansuripur (Tutorial) Tr. 79-80. A standard CD-R or CD-RW can hold over 400 to 500 times the amount of information of a 1.44 MB high density floppy disc. CX-50 at Bates No. PA033204. Information written on a CD-R or CD-RW runs along a spiral-shaped track that is read and recorded in a direction from near the center of the disc to its outer circumference. Hesselink (Tutorial) Tr. 19-20. On a modern disc, if that spiral track were unwound, it would be approximately 3 1/2 miles long. Hesselink (Tutorial) Tr. 20; Mansuripur (Tutorial) Tr. 97.

A laser is used to write on a CD-R. A beam of laser light contacts a layer on the disc that is light-absorbent. Mansuripur (Tutorial) Tr. 96-97. By turning the laser on and off, a series of "pits" (depressions caused by the laser) and "lands" (flat surfaces) occurs that represents a series of binary values (0s and 1s). *Id.* A CD-RW contains a light-sensitive layer comprised of a compound exhibiting high reflectivity under certain heating conditions. Mansuripur (Tutorial) Tr. 89-91. As with a CD-R, the power of the laser used during writing to a CD-RW can be alternated to form a pattern on the disc that represents a series of binary values. *Id.* However, unlike a CD-R, which may be written upon (or "written to") only once, a CD-RW may be erased and written to many times because the compound in the light-sensitive area can be reverted back to its original state under certain heating conditions caused by the laser. *Id.*

A CD-R can be read and played by a standard CD audio player because the properties of the pits and lands formed in the CD-R have characteristics similar to those of a conventional compact disc, which is sometimes referred to a "CD-DA." Hesselink (Tutorial) Tr. 55. Yet, a CD-RW requires a different type of player that has an optical pickup capable of reading the lower reflectivity of these discs. Heemskerk Dep. (RX-1477C/JX-1C) Tr. 177-178. CD-Rs and CD-RWs can be used to store either audio or other data files. CX-162, p. I-1; CX-163, p. I-1; Mansuripur Tr. 1176.

The accused products in this investigation are CD-Rs and CD-RWs manufactured overseas by Princo Taiwan and Gigastorage Taiwan. The other respondents import and/or sell the accused products. *See* CPFF 3-24; Respondents' Identification of Unopposed Findings of Fact and Conclusions of Law at 1.

As authorized by the Notice of Investigation, Philips accuses Respondents' products of infringing certain claims of the U.S. Letters Patent 4,807,209, U.S. Letters Patent 4,962,493, U.S. Letters Patent 4,972,401, U.S. Letters Patent 5,023,856, U.S. Letters Patent 4,999,825 and U.S. Letters Patent 5,418,764.[FN6] Respondents deny Philips' allegations of patent infringement. Respondents allege that the accused products are outside the scope of the asserted claims, and further that the asserted claims are invalid.

II. IMPORTATION OR SALE

On April 4, 2003, the Administrative Law Judge granted Philips' motion for summary determination of importation and sale with respect to Respondents' CD-R and CD-RW discs. The Initial Determination became the determination of the Commission. Order No. 20 (Initial Determination); Commission Decision Not to Review (Apr. 24, 2003). Consequently, the importation or sale requirement of section 337 has been established for purposes of this Initial Determination.[FN7]

III. THE '209 PATENT AND THE '493 PATENT

A. Claim Construction

Any finding of infringement or non-infringement requires a two-step analytical approach. First, the asserted claims of a patent must be construed as a matter of law to determine their proper scope. Second, a factual determination must be made as to whether the properly construed claims read on an accused device. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976, 979 (Fed. Cir.1995)(*en banc*), *aff'd*, 517 U.S. 370 (1996).

To construe a claim, one first looks to the claim language. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305

(Fed. Cir.1999)("The starting point for any claim construction must be the claims themselves."); *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1186 (Fed. Cir.1998) ("The appropriate starting point ... is always the language of the asserted claim itself."). Then, one looks to the other intrinsic evidence, beginning with the specification and concluding with the prosecution history, if in evidence. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996); *Markman*, 52 F.3d at 979 ("Claims must be read in view of the specification, of which they are a part.").

If the claim language is clear on its face, then a court's consideration of other intrinsic evidence is restricted to determining if a deviation from the clear language of the claims is specified. A deviation may be necessary if a patentee has chosen to be his own lexicographer and use terms in a manner other than their ordinary meaning. *Vitronics*, 90 F.3d at 1582. Any such special definition given to a word must be clearly defined in the specification. *Markman*, 52 F.3d at 980. A deviation may also be necessary if a patentee has "relinquished [a] potential claim construction in an amendment to the claim or in an argument to overcome or distinguish a reference." *Interactive Gift Express*, 231 F.3d at 865 (quoting *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 979 (Fed. Cir. 1999)).

One looks "to the specification to ascertain the meaning of the claim term as it is used by the inventor in the context of the entirety of his invention," and not merely to limit a claim term. Examples or embodiments appearing in the written description may not be read into a claim. *Comark*, 156 F.3d at 1186-87. Thus, care must be taken to avoid reading "limitations appearing in the specification ... into [the] claims." *Intervet Am., Inc. v. Kee-Vet Lab., Inc.*, 887 F.2d 1050, 1053 (Fed. Cir.1989).

If the meaning of the claim limitation is apparent from the totality of the intrinsic evidence, then the claim has been construed. If, however, a claim limitation remains unclear, one may look to extrinsic evidence to help resolve the lack of clarity.[FN8] Relying on extrinsic evidence to construe a claim is "proper only when the claim language remains genuinely ambiguous after consideration of the intrinsic evidence." *Bell & Howell Document Mgmt. Prods. Co. v. Altek Sys.*, 132 F.3d 701, 706 (Fed. Cir.1997); *Vitronics*, 90 F.3d at 1583-85 ("Such instances will rarely, if ever, occur.").

Extrinsic evidence may always be consulted, however, to assist in understanding the underlying technology. *See Pitney Bowes*, 182 F.3d at 1309 ("[C]onsultation of extrinsic evidence is particularly appropriate to ensure that [a judge's] understanding of the technical aspects of the patent is not entirely at variance with the understanding of one skilled in the art."); *Vitronics*, 90 F.3d at 1585 ("Had the district court relied on the expert testimony and other extrinsic evidence solely to help it understand the underlying technology, we could not say the district court was in error."). Extrinsic evidence may never be used "for the purpose of varying or contradicting the terms in the claims." *Markman*, 52 F.3d at 981.

As stated in the in the *Markman*, opinion, "the focus in construing disputed terms in claim language is not the subjective intent of the parties to the patent contract when they used a particular term. Rather the focus is on the objective test of what one of ordinary skill in the art at the time of the invention would have understood the term to mean." 52 F.3d at 968. *Accord Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1578 (Fed. Cir.1996)(The court assigns a claim term the meaning that it would be given by persons experienced in the field of the invention.). Nevertheless, it is a basic principle of claim construction that "[w]hen claims are amenable to more than one construction, they should when reasonably possible be interpreted so as to preserve their validity." *Modine Mfg. Co. v. U.S. Int'l Trade Comm'n*, 75 F.3d 1545, 1557 (Fed. Cir. 1996), *overruled on other grounds, Festo Corp.* v. *Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558 (Fed. Cir. 2000), *rev'd*, 535 U.S. 722 (2002).

The '209 and '493 patents are discussed in tandem in the parties' briefs, and are considered together in this Initial Determination. The '203 and '493 patents share much of the same related application data, and were issued by the United States Patent and Trademark Office ("PTO") to the same inventors, i.e., Pieter Kramer and Jan Roos of the Netherlands. The '493 patent application is a continuation of the application upon which the '209 patent issued, and the disclosures contained in the specifications of the two patents are the same.[FN9] *See* CX-12/RX-58 ('209 Patent); CX-13 ('493 Patent).

United States Patent No. 4,807,209, entitled "Record Carrier Body with a Follow-On Track and Apparatus for Recording Information Thereon," issued on February 21, 1989. CX-12/RX-58 ('209 Patent).[FN10] The asserted claims of the '209 patent are independent claim 1 and dependent claims 5 and 6. The asserted claims are as follows:

> **1.** A disk-shaped record carrier body for recording thereon information with a write beam of radiation, said record carrier body having a radiation-sensitive layer on which the information to be recorded is written with the write beam and a continuous, generally circular, diffractive follow-on track extending about the center of said disk-shaped record carrier body for guiding the write beam during recording of the information, said follow-on track being configured to diffract radiation incident thereon when scanned with a spot of radiation of a predetermined size and having a width which is smaller than the dimension of the spot in the width direction so that the intensity distribution of the radiation coming from the record carrier body varies with movement of the spot relative to the center of said follow-on track due to said diffraction so as to enable the position of the spot relative to said follow-on track to be determined.
>
> * * *
>
> **5.** The record carrier body according to claims **1** or **2**[FN11] wherein said follow-on track is a groove formed in said record carrier body.
>
> **6.** The record carrier body according to claim **1** wherein said follow-on track contains prerecorded data capable of being read with a read beam of radiation.

CX-12/RX-58 ('209 Patent), col. 5, lines 2-19, col. 5, lines 32-34, col. 5, lines 34-37.

United States Patent No. 4,962,493, entitled "Record Carrier Body With A Follow-On Track And Apparatus For Recording Information Thereon," issued on October 9, 1990, about a year-and-a-half after the '209 patent.[FN12] CX-13 ('493 Patent). Philips asserts only claim 11 of the '493 patent in this investigation. Claim 11 is an independent claim, and is as follows:

> **11**. A record carrier body for recording thereon information with a write beam of radiation, said record carrier body having a radiation-sensitive layer on which the information to be recorded is written with the write beam and a diffractive follow-on track in the form of an elongated groove formed in said record carrier body for guiding the write beam during recording of the information, said groove being configured to diffract radiation incident thereon when scanned with a spot of radiation of a predetermined size and having a width which is smaller than the dimension of the spot in the width direction so that the intensity distribution of the radiation coming from the record carrier body varies with movement of the spot relative to the center of said groove due to said diffraction so as to enable the position of the spot relative to said groove to be determined.

CX-13 ('493 Patent), col. 6, lines 38-53.

With respect to the '209 patent, the '493 patent, and all of the asserted patents in this investigation, a person of ordinary skill in the art of optical data storage (the field of the inventions at issue) would have a bachelor's degree in electrical engineering, physics, optics or a similar science, with two to five years of work experience with optical data storage. *See* Hesselink Tr. 590; Mansuripur Tr. 1099. Beyond this threshold issue, there are certain areas of fundamental dispute between Philips, the Staff and Respondents as to the proper interpretation of the asserted claims. The disputes concern the asserted independent claims, and affect all of the '209 and '493 patent claims at issue.

The claim construction issues relevant to the '209 and '493 patent concern the concept of tracking and scanning a disc, or a portion thereof, to make sure that the laser beam used to read or write data is properly directed at the elongated track that runs in a spiral out from near the center of the disc.

There are always imperfections in the overall systems used to read or write discs. For example, the center of the disc may not be placed exactly on the spindle axis, or the disc may have been warped due to exposure to heat. As the disc spins under the focus of a beam, it may move to the right or to the left. Thus, a particular part of a track may not always be where it is supposed to be. A device used to read a CD or to record data upon a CD (i.e, "write to" a CD) must find out where the track is relative to the focused beam, and must also try to move the focused beam to keep it on track at all times. A CD must be made in a way so that a method of tracking can be used.

The technical experts who testified in this investigation provided information about two common methods of tracking. One tracking method involves three beams of light, and the other tracking method uses one beam. *See, e.g.*, Mansuripur (Tutorial)

Tr. 97-107; Hesselink (Tutorial) Tr 29-32, 45-53; Hesselink Tr. 523-528.

Typically, in the three-beam method, a laser travels through a splitter that breaks up the beam of laser light into the three beams. All three beams are directed toward the disc by the beam splitter and focused on the disc by lenses. Consequently, three beams are focused on the disc, which may be called beams, A, B and C. Beam B is the brightest of the three, and must stay on the track, for example to read the pits and lands by which data is encoded. Beams A and C are not as bright, and are offset to either side of beam B in a radial direction - i.e., although beams A and C remain relatively close to beam B, one beam is offset toward the center of the disc, and one toward the edge of the disc. Beams A and C are used to determine whether the system is on track.

Light from the three beams is received by three photodetectors, one for each beam. The system processes information from the detectors for beams A and C to determine whether the laser beam transmitted from the player or recorder is on track or not. The basis for this determination is the difference between the output or signal of detectors A and C. This is known as the track error signal, mathematically represented by A minus C.

For example, when the laser (and thus beam B split from it) is perfectly on track, beam B is centered on the center line of the track, A is slightly offset to the top, C is slightly offset to the bottom. At the detectors, the light from beam A and the light from beam C should be of equal intensity. When the system notices that A and C have equal brightness, no action is needed. However, if the disc shifts off-center in one direction, all three beams A, B and C are slightly off track. So, for example, during a read operation, beam A might shine mostly on the flat area of the land adjacent to the groove,[FN13] while C might shine in the groove, possibly in a pit. In that case, the light coming from beam A to the detector for beam A would be exceptionally strong, while the light coming from beam C would then be mostly lost, and thus little light would be detected by the detector for beam C. The system should notice that A is brighter than C, and that should indicate that all three beams have moved off track. In that case, although the beams have moved off track due to the way the disc is spinning, it is not the disc that is adjusted. Rather, the device adjusts a lens through which the laser shines, and shifts it down slightly to make sure that B remains on the center. In other instances, an opposite shift may occur, and the light detected from beam C would be stronger than the light from beam A. In that case, the device would shift the focus of the laser, and thus beams A, B and C would move in the other direction to stay on track.

When one beam is used, the system it is often referred to as the "push-pull" method, referring to the fact that the system has either to push or to pull the laser beam in order to stay on the track. In the one-beam method, the laser light is focused on the disc in one beam, which shines on the groove and on the adjacent lands. Diffracted light in the form of three beams arrives back from the disc at the photodetector. The photodetector is sometimes called a "split photodetector" because it can detect differences in the light on one side of the detector versus the other.

Light comes from the laser towards the disc "in phase," with the same oscillations. However, light takes longer to reach the groove than it takes to reach the adjacent lands, and as a result a "phase shift" occurs. The light from the groove is phase-shifted relative to the light coming back from the two land regions. This phase-shifting is a disturbance that causes interference and diffraction. Although one beam is transmitted toward the disc, three beams are returned to the lens. Of the three returning beams, the center beam is returned to the system in its entirety, and if the laser is centered on the track, equal parts - although not all - of the two beams created to either side of the center beam (i.e., the beams from lands) are returned. Thus, a pattern of intensity resembling the pattern of stitching on a baseball is formed on the lens. This system of scanning or tracking is sometimes called the "baseball pattern" method. If the laser beam is centered correctly on the track, the pattern on the lens is symmetric, and the intensity of the signals at the photodetector (or split photodetector) are the same on both sides.

If the beam shifts up, due to imperfections in the spinning of the disc, the baseball pattern becomes asymmetric or disappears. For example, the left half may be bright and the right half will be less bright. When the system senses such a "positive" signal, it knows that the beam has shifted up relative to the position of the disc, and so the device proceeds to bring the beam down. The opposite shift can also occur, in which case, the right half of the split detector becomes bright, the left half becomes dark, the different signal is considered "negative," and the device proceeds to push the spot back up.

Respondents raise three areas of disputed claim construction, which are intertwined with their defenses of patent invalidity and non-infringement. Respondents argue that the '209 and '493 patents are limited exclusively to a "push-pull" tracking system based on the diffraction pattern produced by a single scanning spot of radiation. It is argued that the scanning spot of radiation is wider than the diffractive follow-on track, that the "diffractive follow-on track" is wider than the groove, and that the scanning spot must overlap both land regions surrounding the groove by a significant amount so that radiation appears in a "baseball pattern" of sufficient intensity to be accurately detected. Respondents argue that the "diffractive follow-on track" required by the asserted claims is equal to what is called the "track pitch" on the disc, i.e., the radial distance on a disc from the center of a land region, across a groove, to the center of the adjacent land region. Respondents also argue that the asserted claims of the '209 and '493 patents require a system that includes a record carrier and a recording device. It is argued that it is impossible to determine whether the claims are practiced by examining a disc alone, and it is necessary to operate a disc in a recorder/player to determine if a radiation spot is wider that the width of the follow-on track, and if the system is properly tracking the scanning spot. *See* Respondents' Post-Hearing Patent Brief at 9-12; Respondents' Post-Hearing Patent Reply Brief at 2-5, 11; *see also* RPFF 1225 (defining "track pitch").

Philips argues that the '209 and '493 patents claim and disclose a record carrier (i.e., a disc) with a "follow-on track" configured to use light diffracted by the track to generate an error tracking signal that keeps the write laser on the center of the track while it is recording data. It is argued that the claim language itself defines what makes the "follow-on track" "diffractive," i.e., that the laser spot is wider than the track it is following. Philips also argues that the patents claim and enable one of ordinary skill to make a disc that may be used with a three-beam tracking system, as disclosed in the patent specifications, and that a disc need not actually be used in a recorder in order to infringe the asserted claims. *See* Philips' Post-Hearing Patent Brief at 2-4, 11-18; Philips' Post-Hearing Patent Reply Brief at 1-3.

The Commission Investigative Staff argues that Philips' proposed construction of the "follow-on track" is correct, and is the only logical interpretation supported by the claim language and specifications that would yield a working embodiment of the patent. The Staff rejects Respondents' argument that the "follow-on track" should be interpreted to include the groove and half of the land on each side. OUII Post-Hearing Patent Brief at 10-12. The Staff further argues that independent claim 1 of the '209 patent and independent claim 11 of the '493 patent are not limited to a system in which there can be only a single spot of radiation used for tracking purposes. It is argued that, following the usual practice in claim interpretation, reference to "a spot" in the claim language should be understood to refer to one or more than one of the particular item in question, and further that the claims were clearly intended to cover more than just a single spot inasmuch as the preferred embodiment disclosed in the specifications is a three-beam system used to keep the laser centered on the track. OUII Post-Hearing Patent Brief at 13 (citing *Tate Access Floors, Inc., v. Interface Architectural Resources, Inc.*, 279 F.3d 1357, 1370 (Fed. Cir. 2002); OUII Post-Hearing Patent Reply Brief at 1-2.

The Width of the "Follow-On Track"

The text of the asserted '209 and '493 patent claims are for the most part a description of the "follow-on track." In the first five-and-one-half lines of independent claim 1 of the '209 patent, the inventors claim a "disk-shaped record carrier body" (or "disc" in today's common usage) for recording information with a beam of radiation. In order to accomplish this task, the claim recites that the disc or "disk-shaped record carrier" must have a radiation-sensitive layer. *See* CX-12/RX-58 ('209 Patent), col. 5, lines 1-6. The next thirteen lines of the claim describe the "follow-on track" that is to be placed in a "generally circular" pattern on the disc "for guiding the write beam during recording of information." *See Id.*, col. 5, lines 6-19.

Claim 1 of the '209 patent specifies that the follow-on tack must be "diffractive," and subsequently, the claim provides details about how a spot of radiation can be used to scan the disc "so as to enable the position of the spot relative to said follow-on track to be determined." The nature of the scanning process is the subject of substantial dispute between Philips and the Staff on one side and Respondents on the other, and must be resolved by the Administrative Law Judge. Nevertheless, when one examines the plain language of claim 1 of the '209 patent, one learns that subsequent to the first five or so lines of the claim, all of the descriptive or limiting language, which concerns the scanning process, is provided so that one can understand how the follow-on track is, in the words of the claim, "being configured." Thus, claim 1 of the '209 patent is not a claim on a particular method of writing to or reading a disc, or of scanning a disc with a beam or spot of radiation to determine its position. Rather, independent claim 1 of the '209 patent is a claim on an object or product, namely a "disk-shaped record carrier body" with

certain limitations. One limitation placed on that "disk-shaped carrier" is a "follow-on track," which must be "configured" so that it can be used in a particular way. The limitation is written in terms of the physical configuration of the follow-on track.

The same observation can be made of all the other asserted claims of the '209 and '493 patents. Asserted claims 5 and 6 of the '209 patent, depend from independent claim land contain additional limitations pertaining to the follow-on track. Claim 5 provides that the "follow on track is a groove formed in said record carrier body." *See Id.*, col. 5, lines 32-34. Claim 6 provides that the "follow on track contains prerecorded data capable of being read with a beam of radiation." *Id.*, col. 5, lines 35-37. Claim 11 of the '493 patent is similar to claim 1 of the '209 patent in several respects, including the fact that most of the limiting language contained in the claim pertains to the configuration of the "follow-on track" to be used with a radiation scanning method. Claim 11 of the '493 patent is narrower than claim 1 of the '209 patent because it also incorporates the limitation that the track be "in the form of an elongated groove." *See* CX-13, col. 6, lines 38-53. The questions raised about claim construction for the '209 and '493 patents are the same for each of the asserted claims, whether those questions concern the follow-on track or any other disputed limitation or aspect of the claims.

One of the fundamental questions raised in this investigation about the configuration of the follow-on track relates to its width on the disc. The question is not one of the mechanics of how a measurement could be taken or read. The question pertains to which parts of a disk-shaped record carrier body or disc are to be considered the follow-on track, and which are not. The claims and the specifications of the '209 and '493 patents provide limitations and descriptions of the track.

Independent claim 1 of the '209 patent requires a follow-on track "having a width which is smaller than the dimension of the spot [of radiation] in the width direction." Similarly, independent claim 11 of the '493 patent requires that the track "hav[e] a width which is smaller than the dimension of the spot in the width direction." In both cases, the claims state that the width of the track is limited so that the intensity distribution of the radiation coming from the record carrier body varies with movement of the spot relative to the center of the follow-on track, which may be a groove. Thus, the width of the follow-on track must be smaller than the spot of radiation. Indeed, the parties are in agreement that diffraction in this case occurs because a spot of radiation (i.e., light from the laser) is wider than the track.[FN14] *See, e.g.*, Philips' Post-Hearing Patent Brief at 13; Respondents' Post-Hearing Patent Reply Brief at 4; OUII Post-Hearing Patent Brief at 12.

Furthermore, the claims contemplate space between the tracks, a point which is especially clear in the case of the limitation added by dependent claim 5 of the '209 patent and by independent claim 11 of the '493 patent. Reference to claim 5 of the '209 patent and claim 11 of the '493 patent shows, respectively, that the claims explicitly state that the follow-on track "*is a groove* formed in said record carrier body" and is "*in the form of an elongated groove*." By limiting the follow-on track to a groove, these claims necessarily indicate a differentiation on the disc between areas that consist of a groove (and thus a follow-on track) and areas that are not grooved (thus not a follow-on track). Consequently, according to the plain claim language, when a groove is used for the follow-on track, the follow-on track is the groove, and does not extend to the land region to either side of it. Although Respondents argue that their proposed claim construction is based on the claim language, their proposal, which requires the follow-on track to extend beyond the groove is incompatible with the claims.

Furthermore, the specifications of the '209 and '493 patent provide several descriptions of follow-on tracks. The specifications illustrate that a follow-on track may take a variety of forms, and in accordance with the claims, each configuration disclosed in the specification excludes the adjacent land regions. In each example, the track is differentiated from the surface of the disc. For example, the specifications provide:

> The opto-electronic device,[FN15] which in the read apparatus is used for determining the position of the read beam relative to the track to be read during reading, may also be used to ensure that during information writing, the write beam accurately follows the track provided on the record carrier body, hereinafter referred to as a "follow-on track" for the sake of brevity. *The follow-on track can be optically discriminated from the rest of the record carrier body by making said track V-shaped and pressing it in the surface of the record carrier body*, as described in German Patent Application No. 2,038,874. *The V-shaped groove causes a beam of radiation to be split into two sub-beams, the intensities of the sub-beams being defined by the degree of centering of the radiation beam relative to the groove.*
> *It is an object of the invention to indicate other possibilities of optically discriminating the follow-on track.* The record carrier body according to the invention is characterized in that the follow-on track is a flat track, and that the follow-on

track influences the direction of a radiation beam in the same way as, but the radiation distribution over a beam section in a different way, than the rest of the surface of the record carrier body on which the information is to be written.

* * *

The follow-on track may be provided at the surface of the record carrier body in different forms. For example, the reflection coefficient or the absorption coefficient of the follow-on track may differ from its surrounding, so that the intensity of a beam which emerges from the recordcarrier body differs according to whether the beam has or has not interacted with the track. However, it is also possible to make the follow-on track interact with the polarization condition of the beam in a different way than with the area surrounding the track. Changes in the direction of polarization of the beam can then be converted into intensity differences with the aid of a polarization sensitive element. It is also possible to employ a follow-on track which under the influence of an incident beam starts to emit radiation in a manner which differs from its surrounding area. The emission of radiation by the follow-on track may be based on a fluorescence mechanism.

The follow-on track can be provided on the record carrier body in accordance with different methods, depending on the nature of information storage in the final record carrier. For example, *a photo-resist may be coated onto the disk-shaped record carrier body*. This coating may be exposed to continuous radiation, the carrier body, for example, being also subjected to a radial displacement in addition to a rotation relative to the radiation source. *Thus, a spiral track is exposed. Depending on the type of photo-resist, either the exposed or the non-exposed parts will disappear upon development, so that the substrate, for example a reflecting layer, appears which layer can be etched away or can be rendered absorbent.*

For the provision of the follow-on track use can also be made of different information storage techniques. For example, a layer of a magneto-optical or photochromic material can be spirally and continuously exposed with a high-power radiation beam, so that the polarizing properties or the color properties of the layer are changed.

CX12/RX-58 ('209 Patent), col. 36 though col. 2, line 54; CX-13 ('493 Patent), col. 1, line 39 through col. 2, line 56 (emphasis added).

Thus, the specifications of the '209 and '493 patents illustrate that the claimed follow-on track is distinct form its surrounding areas, even to the point of being optically discriminated from the rest of the record carrier body. The follow-on track may consist of a V-shaped groove that is pressed into the surface of the disc and causes radiation to be split into sub-beams, or (with the use of photoresist) the follow-on track may be formed by part of the disc surface being "etched away." In any case, the follow-on track is distinct from its surrounding areas or the rest of the disc, and further consists only of the V-shaped groove, the etched away layer, or such other "spiral" or "generally circular" track covered by the claims. By contrast, there is no indication in the claims or in disclosures of the '209 and '493 patent specifications that a follow-on track includes any area outside the groove or layer which has been placed in the record carrier body. Furthermore, there is enough separation between portions of the follow-on track so that it is clearly discerned from the rest of the record carrier body. From the standpoint of optics, diffraction or in the words of the patent specification "*caus[ing] a beam of radiation to be split into two sub-beams*" occurs because the groove is different from the rest of the record carrier body.

This understanding of the claimed follow-on track is contrary to the Respondents' proposed interpretation. Respondents' differing proposed construction of the follow-on track is closely related to their reading of the asserted claims to cover a record carrier body suitable for only one method of scanning, i.e., the "push-pull" method, also known as the "baseball pattern" method. Respondents' proposed construction is also dependent upon their particular understanding of how the push-pull method works and the type of track that is necessary to practice it. Respondents' proposed construction excludes all other methods, including the three-beam method which, it is agreed by all parties, is detailed in the '209 and '493 patent specifications.[FN16] Respondents must, and do, therefore argue that the claims of the '209 and '493 patents are disassociated from the specification.[FN17] Respondents argue that, in fact, "a diffractive follow-on track is simply not disclosed in the specifications." Respondents' Post-Hearing Patent Brief at 10. Respondents support their proposed construction primarily on two grounds: the particular type of intensity distribution supposedly necessary for use in the push-pull or baseball method; and the supposed plain meaning of the claim language, particularly their argument that in this case track width on a disc is the same as track pitch. *See Id.* at 11.

With respect to intensity distribution, Respondents argue that the claim limitation of a "diffractive follow-on track," "permit[s] the spot relative to the track to be determined and requires that the scanning spot impinge on the groove and a *substantial* amount of the surrounding lands." *Id.* (emphasis added). Having disavowed any connection between the embodiments disclosed in the patent specifications and the claims, Respondents argue that "[t]o determine how much of the adjacent land regions is required, resort is had to the claim language itself and the understanding of persons skilled in the art." *Id.* It is further argued that "[t]he intensity distribution recited in the claims refers to a diffraction pattern formed by the overlap between the +1 and -1 diffraction orders with the zero diffraction order, and is often referred to as the 'baseball pattern' because of the pattern's resemblance to a baseball. In order that the system be capable of determining the position of the scanning spot, a diffraction pattern of *suitable* strength must be formed. This requires that the scanning spot overlap the land regions surrounding the groove by a *significant amount* during scanning such that the overlapped radiation in the baseball pattern is of sufficient intensity to be accurately detected." *Id.* (emphasis added).

As seen from the plain language of the claims, they do not explicitly refer to a diffraction pattern formed by the overlap between the +1 and -1 diffraction orders with the zero diffraction order. For the conclusion that the asserted claims pertain exclusively to the push-pull or baseball pattern method of scanning, Respondents rely primarily upon the hearing testimony of their expert. *See Id.* As discussed below, a limited interpretation of the asserted claims, which has the effect of nullifying the patent specifications, must be rejected. However, even if one were to accept the testimony of Respondents' expert, and conclude that the claims are limited to a disc only for use with the push-pull or baseball pattern method, a question would remain as to how much of the surrounding land regions must be included in the track in order to be "substantial," "significant" or to provide "suitable strength" or "sufficient intensity." Respondents do not provide a precise answer to the question they raise about how much of the land should be included with the groove in order to practice the push-pull or baseball method, as they understand it, and to have suitable strength or sufficient intensity. It appears, however, that Respondents concede that the push-pull method does not require use of the entire track pitch, from midpoint of a land region across a groove to the midpoint of an adjacent land region. *See Id.* Yet, Respondents define the diffractive follow-on track of the patents as necessarily encompassing the entire track pitch.

Respondents turn again primarily to the testimony of their expert to argue that "[p]ersons having ordinary skill in the art understand a 'track' on an optical disc to refer to either a groove or an area on a disc from the midpoint of a land region across a groove to the midpoint of an adjacent land region." *Id.* (citations omitted). Respondents further argue that any definition of the track other than the groove or the entire track pitch would be considered arbitrary to persons of ordinary skill in the art. According to Respondents, a track must be defined as either the groove alone or the entire track pitch with no definition possible that delineates an area in between. Therefore, in order to use the push-pull or baseball pattern method of scanning, according to Respondents, the track would be understood to be the track pitch. *Id.*

Respondents' proposed interpretation of the follow-on track, such that its width is to equal track pitch and nothing less, must be rejected on several grounds.

Respondents appear to argue that because the track is "diffractive" it must encompass the entire surface on which the beam of radiation (such as laser light) is directed (and possibly more). However, as required by the independent claims, a claimed follow-on track (such as a groove) is diffractive precisely because it is smaller than a spot of radiation. As pointed out by Philips' expert at the hearing, as a matter of optics - and thus known to a person of ordinary skill - the width of the track is not what makes the track diffractive. Rather, as indicated in the claims of the '209 and '493 patents, diffraction occurs because the follow-on track is not as wide as a spot of radiation. This difference in size causes interaction between light and a structure, such as a groove, on an otherwise relatively smooth surface. Diffraction occurs because of the presence of the groove. Thus, a follow-on track in the form of a groove, which is smaller than a spot of radiation, is an example of a diffractive follow-on track. Hesselink Tr. 508-509, 2545.

Moreover, Respondents' interpretation is inconsistent with the proper construction of "follow-on track" based on the claims in view of the specification. Respondents' proposed interpretation of the follow-on track would seem to allow nothing on the disc surface to stand between one portion of the circular track and another.[FN18] Further, Respondents' proposal is, for example, impossible to reconcile with the plain language of claim 5 of the '209 patent and claim 11 of the '493 patent, in which the

follow-on track is explicitly defined as a groove. Even if one discounts the embodiments and teachings of the '209 and '493 patent specifications, as Respondents argue one should do, one cannot read the claim language and say that a track *is a groove* (for example, see the language of claim 5 of the '209 patent) and at the same time say that a track is a groove plus half of the adjacent land regions.

The plain claim language, especially when read in light of the specifications, demonstrates that the follow-on track of the claims at issue is smaller than the spot of radiation used to write on a disc, and in the case of a grooved track, consists of the groove.

Whether the Claims Read Only on a Disc Used with a One-Beam, Push-Pull Scanning System

As discussed above, a key dispute is raised by Respondents' argument that the asserted claims of the '209 and '493 patents claim a "record carrier body" or disc for use with only a one-beam method of scanning known as the "push-pull" method or baseball pattern method, and that the patent specifications, which disclose a three-beam method, do not support the claims. Respondents' Post-Hearing Patent Brief at 9-10; Respondents' Post-Hearing Patent Reply Brief at 2-4. Philips argues that while the claim language is broad enough to cover a one-beam system, there is no basis for limiting the claims to a one-beam system of any sort, including a baseball pattern system. *See* Philips' Post-Hearing Patent Brief at 15 n.20; Philips' Post-Hearing Patent Reply Brief at 1-3. The Commission Investigative Staff argues that both a one-beam and a three-beam system use diffraction for tracking, and that the claims should be construed to cover a one-beam or three-beam system. *See* OUII Post-Hearing Patent Brief at 13; OUII Post-Hearing Reply Brief at 1-4.

Allegations such as those raised by Respondents, to the effect that a preferred embodiment disclosed in the specification is not within the scope of the claims, are rarely found to be correct. For example, in the *Vitronics* case, cited above for its guidance on the proper way to construe a claim, the Federal Circuit was confronted with a dispute concerning the term "solder reflow temperature," as it was used in a claim asserted against an accused infringer. The court observed:

> Indeed, if "solder reflow temperature" were defined to mean liquidus temperature, a preferred (and indeed only) embodiment in the specification would not fall within the scope of the patent claim. *Such an interpretation is rarely, if ever, correct and would require highly persuasive evidentiary support*, which is wholly absent in this case. *See Modine Mfg. Co. v. United States Int'l Trade Comm'n*, 75 F.3d 1545, 1550, 37 USPQ2d 1609, 1612 (Fed.Cir.1996); *see also Hoechst*, 78 F.3d at 1581, 38 USPQ2d at 1130 ("We share the district court's view that it is unlikely that an inventor would define the invention in a way that excluded the preferred embodiment, or that persons of skill in this field would read the specification in such a way.").

93 F.3d at 1383-84 (emphasis added).

Similarly, Respondents' argument that the embodiments of the '209 and '493 patents are not covered by the asserted patent claims must be the subject of highly persuasive evidentiary support.

According to Respondents, the discrepancy between the claims and the specifications of the '209 and '493 patents came about in May of 1984, when, in response to an Office Action, Philips amended the claims of the application that would lead to the '209 patent, so as to require for the first time scanning a diffractive follow-on track with a single spot of radiation, the creation of an intensity distribution due to diffraction of the single spot, and the use of that intensity distribution to determine the position of the scanning spot relative to the track - without amending the specification to provide for the newly claimed invention. *See, e.g.*, Respondents' Post-Hearing Patent Brief at 16. A record of the May 1984 Amendment, as well as the Examiner's rejection of the new claims and the subsequent appeal to the Board of Appeals and Patent Interferences ("PTO Board" or "Board") comprises a large portion of the '209 prosecution history,[FN19] and a review of the relevant portions of the prosecution history is appropriate.

In December 1983, the Examiner rejected all claims of the pending application on several bases.[FN20] *See* CX-37 ('209 Patent Prosecution History), Paper No. 3. In May 1984, Philips (on behalf of the Applicants) amended the claims of the pending application to virtually the same form in which they issued as the '209 patent, and made Remarks concerning the amendment and the Examiner's grounds for rejection. *See* CX-37 ('209 Patent Prosecution History), Paper No. 5.[FN21]

Following the amendment, in October 1984, the Examiner issued a final rejection of the claims on numerous grounds, including

35 U.S.C. § 112 and § 103. *See* CX-37 ('209 Patent Prosecution History), Paper No. 6. In February 1985, Philips filed minor amendments concerning dependency of the claims, and in its Remarks stated its objections to some of the Examiner's statements. Philips also filed an appeal (Appeal No. 663-48) with the PTO Board from the Examiner's October 1984 rejection. CX-37 (209 Patent Prosecution History), Paper No. 8, Paper No. 9.

In its appeal brief, Philips argued that the circular follow-on track is "configured to diffract radiation incident thereon when scanned with a spot of radiation which is larger than the width of the follow-on track." Philips described the claimed invention in terms of a single beam of radiation used with the follow-on track, and explained to the PTO Board that "[b]ecause the incident radiation is diffracted by the follow-on track, less of the radiation will be captured and projected by a lens on a photodetector when the spot is centered on the follow-on track than would be the case when the spot impinges on an adjacent area of the disc. As a result, the intensity distribution of the radiation coming from the disc will vary with the radial movement of the spot relative to the center of the follow-on track thereby enabling the radial position of the spot to be accurately determined." CX-37 ('209 Patent Prosecution History), Paper No. 12, Appeal Brief at 6.

In June 1985, the Examiner's Answer addressed several issues, including a one-beam versus a three-beam system. The Examiner argued that U.S. Patent No. 3,956,582, cited in the pending application (and the '209 patent and '493 patent, as issued), uses a spot with a width greater than "non-follow on information areas," and would not be enabling to one of ordinary skill in the art. Further, the Examiner argued that the major embodiment and the only depicted embodiment of the pending application uses a grating that "splits the beam into three beams (a, b, and c)." The Examiner explained his understanding of the specification's three-beam system, and his understanding of the referenced '582 patent's one-beam system. Commenting on the '582 patent's system, the Examiner emphasized to the PTO Board that the beam used in the '582 patent is not a tracking beam, and: "It has only one beam." CX-37 ('209 Patent Prosecution History), Paper No. 13, Examiner's Answer at 6-8 (emphasis in original). The Examiner argued that if the '582 patent system were used for tracking, a "major portion of figure 1 would be useless," and referred specifically to the three photodetectors used for the three-beam method. The Examiner argued that a one-beam system and a three-beam system were incompatible, and asked rhetorically: "Which system is intended to be used?" *Id.*

The final briefing to the PTO Board occurred in November 1985, when Philips filed its Reply Brief. Philips argued, among other things, that the specification of the pending application and its predecessors disclosed a continuous, optically detectable follow-on track for guiding a write beam during the recording of information, and that the application provides several examples, including a follow-on track in the form of a groove which is configured to diffract light in the manner described in the '582 patent. Philips argued that the follow-on track is described in the then-pending application, and that the '582 patent was not referenced for its supposed disclosure of a follow-on track. Rather, according to Philips, "[t]he '582 patent was cited for its teaching of how a follow-on track in the form of a groove is to be optically detected by taking advantage of the diffraction phenomenon."[FN22] CX-37 ('209 Patent Prosecution History), Paper No. 16, Reply Brief at 3-4. With respect to the Examiner's argument that the optical system of the '582 patent is fundamentally different or incompatible with the system in the pending application's Figure 1, Philips asked what relevance that should have to the appeal, and stated: "The mere fact that two optical systems are different or incompatible with each other does not make them unsuited for use with the claimed record carrier."[FN23] Philips explained how a one-beam or "single beam system" could be used with the follow-on track, and also argued that "contrary to the Examiner's contention, there is no reason why the three beam arrangement of the apparatus shown in Fig. 1 of the present application cannot be used to track the groove," providing details of how a three-beam system would work. It was argued that "it is evident the apparatus shown in Fig. 1 of the present application can be readily used to track or follow a diffractive follow-on track such as that recited in the claims." *Id.*, Appeal Brief at 6-8.

Consequently, during the prosecution of the '209 patent (which is related to the '493 patent) Philips stated that it sought claims broad enough to cover a record carrier body for use with a one-beam or a three-beam tracking system, and that the specification was adequate to support such claims. The Examiner argued that the specification could not support both methods. A controversy about whether the claims had within their scope a one-beam and/or a three-beam system, and whether the specification could support a one-beam system, was placed squarely before the Board. The arguments and the statements made on behalf of the Applicants and the Examiner are part of the prosecution history of the '209 patent, as is the PTO Board's resolution of the conflict.

On May 20, 1988, the PTO Board issued its opinion in *Ex Parte Pieter Kramer and Jan Roos*, in which the Board stated that it had not sustained the rejection of any of the claims on any of the grounds enumerated by the Examiner, and that the decision of the Examiner was reversed. CX-37 ('209 Patent Prosecution History), Paper No. 17, PTO Board Decision. A Notice of Allowability issued in response to the Board's opinion. CX-37 ('209 Patent Prosecution History), Paper No. 18.

The PTO Board addressed the several objections that the Examiner had to the claims, including, in the words of the PTO Board, "the examiner's problem ... with the diffractive follow-on track and the adequacy of its disclosure." CX-37 ('209 Patent Prosecution History), Paper No. 17, PTO Board Decision at 6.

The Board stated that in its view the Examiner had not met his initial burden of establishing a reasonable basis for questioning the adequacy of the specification's disclosure, and that "[i]t is clear to us that one of ordinary skill in the art would be enabled from the instant disclosure to make and use the claimed invention." *Id.* The Board noted that the specification provides an adequate description of a process in which "beams reflected from the record carrier body are reflected by mirrors to detectors," as well as a reference to the '582 patent, as an example of how the technique may be applied to a follow-on track that is a molded groove.[FN24] The Board stated that inasmuch as the Examiner failed to meet even his initial burden, the Board was not required to reach the question of whether the application was sufficient at the time of its filing. Yet, the Board in its opinion continued: "However, in view of the extensive arguments made by appellants and the examiner with regard to these two documents [i.e., the '582 patent and an affidavit concerning enablement], we feel constrained to make the following observations." *Id.*, Decision at 6-7.

The PTO Board continued by acknowledging the Examiner's complaint that the '582 patent does not disclose diffraction using the grating (element **11**) and the three detectors (elements **17, 18, and 19**) as used in the specification's embodiment, and further that the '582 patent "has only one beam," does not disclose a follow-on track, and uses a single detector. *Id.* at 7 (quoting the Examiner's Answer)(emphasis in original). The Board surmised that in essence the Examiner's objection was based on the fact that the '582 patent did not support the whole of the claimed invention, and that such an objection could not provide a basis for rejection of the application. *Id.* at 7-8. Later in the opinion (in a discussion of prior art), the Board indicated that it understood the arguments made on behalf of the Applicants to the effect that the claims cover a three-beam and a one-beam method, and also understood the claims to cover both systems. The Board explained the invention in terms associated with a one-beam approach, and the use of intensity distribution for tracking, as follows:

> The instant claimed invention uses a spot of radiation of predetermined size in combination with the claimed follow-on track so that the intensity distribution on the track will vary with the position of the spot and said position of the spot relative to the track will be determined by measuring the intensity of radiation reflected back from the track.

CX-37 ('209 Patent Prosecution History), Paper No 17, PTO Board Decision at 9-10.

It is clear from the prosecution history that when the claims were amended in 1984, the Examiner immediately raised the issue of claims that cover a one-beam method and a specification embodiment that uses a three-beam method. The Applicants (Philips) consistently and explicitly took the position that the claims covered record carrier bodies or discs for use with either a one-beam or a three-beam system. It is also clear that the Board found "[t]he mere fact that two optical systems are different or incompatible with each other does not make them unsuited for use with the claimed record carrier," and that totality of the disclosures in the specification and specification's references to other patents, particularly the '582 patent, supported claims for record carriers or discs that could be used with either system.

In this investigation, Respondents revisit the question of whether the asserted claims cover a one-beam system - indeed whether they are restricted to a one-beam system - and whether the claims, so limited, are supported by the specification. Again, the evidence supports a finding that the claims cover discs for use in a one-beam system yet are not restricted to such a system, and further that the embodiment detailed in the specification is not outside the scope of the claims. The record lacks the type of highly persuasive evidence, required by the Federal Circuit's holding in *Vitronics* and similar cases, needed to find that the three-beam embodiment of the specification is outside the scope of the claims.

The claims of the '209 and '493 pertain to an invention that may in certain circumstances use one beam of radiation for tracking purposes. Philips in this investigation, and on behalf of the Applicants during prosecution, has never denied that fact, and, as amply illustrated above, has consistently argued that a one-beam system is part of the overall claimed invention of the patents. Philips has not, however, taken the position that the claims pertain to the particular one-beam push-pull or baseball pattern system proposed by Respondents. Nor could the Administrative Law Judge construe the claims in the manner proposed by Respondents, if for no other reason than Respondents' proposal is based on a faulty reading of the asserted claims that requires the follow-on track to encompass the track pitch. There is no evidence that such a supposed follow-on track is required for the push-pull or baseball pattern system, and no basis for construing the claims in such a manner. Indeed, this proposal discounts the plain language of certain asserted claims that expressly limits the follow-on tack to a groove.[FN25]

The pertinent question is whether the claims can be properly understood to cover a disc for use with three-beam tracking such as disclosed as the preferred embodiment in the specification. A fair reading of the claims demonstrates that they do pertain to a three-beam system.

Respondents' arguments limiting the asserted claims to a single beam system are based in large part on the fact that the independent claims refer to "a" spot or "the" spot of radiation. Respondents also argue that "the" radiation coming from the record carrier due to the "said" diffraction refers to the diffraction pattern formed due to diffraction of the single scanning spot, and that the "intensity distribution" is created by diffracted radiation of the scanning spot and is used to determine the position of the scanning spot relative to the track. The evidence shows that the claim language relied on by Respondents applies at least as well to the three-beam system described in the specification.

As a matter of semantics, it is uncontested by the parties, and confirmed by the Federal Circuit in more than one of its opinions, that use of an article such as "a" in a patent claim is generally understood to refer to one or more than one of the particular item in question, and will receive an exclusively singular interpretation in only those rare circumstances in which there is clear evidence that the article should be limited. *See* Tate Access Floors, Inc., v. Interface Architectural Resources, Inc., 279 F.3d 1357, 1370 (Fed. Cir. 2002); KCJ Corp. v. Kinetic Concepts, Inc., 223 F.3d 1351, 1356 (Fed. Cir. 2000). There are no indications of exclusivity in this instance, especially if one starts from the presumption mandated by law that the patent is valid and that the specification belongs with the claims. The asserted independent claims mention both a "write beam of radiation" and, in a subsequent clause, "a spot of radiation" (or "the spot") used for tracking, indicating that although the write beam and a scanning spot of radiation may be considered the same beam, they may also be different.[FN26] The three-beam embodiment disclosed in the specification employs a diffractive track and measures the varying intensity distribution of the diffracted radiation for the purpose of tracking. Hesselink Tr. 526-528, 2535-44.

The intrinsic evidence shows that the claims are not limited to one-beam, phase-change diffraction.[FN27] CX-12/RX-58 ('209 Patent), col. 3, lines 13-29; CX-13 ('493 Patent), col. 3, lines 16-33. *See also* Hesselink Tr. 2539-2540. The '209 and '582 (RX-1960) patents clearly describe three or four ways in which one can use diffraction for tracking. *See* Hesselink Tr. 2542. Yet, even if the claims were limited to one-beam, phase-change diffraction for tracking, the preferred tracking system embodiment described in the specifications uses a three-beam system for diffractive radial tracking along a groove. *See* Hesselink Tr. 525; CX-12/RX-58 ('209 Patent), Fig. 1; CX-13 ('493 Patent), Fig. 1.

In the embodiment disclosed in the specification, a write laser **5** "forms three secondary beams ... one zero-order beam, beam a, and two first order beams, beams b and c." CX-12/RX-58 ('209 Patent), col. 3, lines 10-13; CX-13 ('493 Patent), col. 3, lines 13-15. "The beam a is then a write beam." CX-12/RX-58 ('209 Patent), col. 3, line 19; CX-13 ('493 Patent), col. 3, line 22. "The two radiation spots produced by the first-order beams b and c are projected onto the edges of the follow-on track during writing...." CX-12/RX-58 ('209 Patent), col. 3, lines 23-27; CX-13 ('493 Patent), col. 3, lines 26-30.

The follow-on track is configured in the preferred embodiment so that it will diffract radiation that is incident upon it. The width of the track, which in this case is a groove, is smaller than each spot of radiation. Light hitting the track will be reflected off it, not because the track is a flat mirror that reflects light in the ordinary sense - because the track is a groove, a structure that differs from the area around it, and provides a sharp edge. Thus, the groove will diffract light. Light incident upon the groove travels toward the detectors due to the diffraction that occurs when it is incident upon the groove. The diffraction provides

signals used to position the laser beam on the track during the recording process. Hesselink Tr. 510-515.[FN28]

The specifications disclose that by comparing the signals supplied by the detectors for beams b and c, an indication can be obtained as to the positions of the radiation spots, and therefore also the write beam relative to the follow-on track. The signals supplied by the detectors can be electronically processed into a control signal by means of which said positions can be corrected. CX-12/RX-58 ('209 Patent), col. 3, lines 39-47; CX-13 ('493 Patent), col. 3, lines 43-51. Thus, in the three-spot system of the specification, the preferred embodiment uses intensity distribution by comparing the intensity distributed between the two detectors. *See* Hesselink Tr. 513. ("There is in this case more light on the right-hand side than there is on the left-hand side, and the patent says that you need to essentially use that intensity distribution in some way as is described in the patent in order to then be able to use the signal that can be derived from that intensity distribution to maintain that spot on the center of the track. So if we go in the opposite direction, we just get the opposite light intensity pattern.").

In the case of the '209 and '493 patents, the claim language, especially in view of the specifications and consistent with the prosecution history, has within its scope a record carrier body configured for use with a three-beam tracking system, such as that disclosed in the specification. The claims of the '209 and '493 patents are not limited to a one-beam tracking system.

Whether the Claims Read Only on a Disc Scanned in a Recorder
Respondents argue that the asserted claims require a recording device in which the record carrier is operated. *See* Respondents' Post-Hearing Patent Brief at 12; Respondents' Post-Hearing Patent Reply Brief at 11. They argue that inasmuch as the claims require that the track have a width smaller than a spot of radiation, and since the radiation is generated by a recording device, such a device is needed to determine infringement. It is argued that three parameters must be known: the wavelength of the light used to form the radiation spot, the numerical aperture of a lens through which the incident radiation passes, and the distribution of the radiation as it impinges on the lens. Further, Respondents, argue, it is impossible to determine whether the system maintains the scanning spot in proper alignment without operating a recording device.

Philips argues that Respondents' own expert has admitted that the size of a spot of radiation can be calculated without the use of a device.[FN29] *See* Philips' Post-Hearing Patent Reply Brief at 4 & n.4.

The Commission Investigative Staff argues that Respondents' proposed interpretation ignores the claim language, which indicates that a follow-on track needs only to be "configured" to diffract radiation when scanned with a spot of radiation. The Staff argues that the spot of radiation is not required, only a disc configured in such a way that when a radiation spot with certain characteristics scans a track, the intensity distribution of the returning light will vary with the movement of the spot. The Staff also notes that there are clear divisions in the '209 and '493 patents between those claims which are direct to discs and those directed to a machine that records information on a disc. OUII Post-Hearing Patent Brief at 17-18 & n.21.

Indeed, Respondents' argument is without foundation in the claim language, and in fact is contrary to limitations contained in the asserted claims. As indicated throughout this discussion, the asserted claims read on a "(disk-shaped) record carrier body" that is limited to have a follow-on track with a particular configuration. Other, non-asserted claims read on a recording apparatus or device.

A track is covered by the claims due to its configuration, without actually diffracting a beam of radiation. If one wants to test a track to determine if it is configured in an infringing manner, one can use a recorder or player, or one can take measurements in a laboratory without using a recorder or player. In either case, one can measure the track and the spot of radiation, and observe the effect of the track on the spot of radiation.[FN30] *See* Hesselink Tr. 528-529. *see also* Mansuripur Tr. 1106-1111 (in theory at least, measurements could be taken without a CD player).

The claims do not require that a disc be placed in an operating recording device in order for there to be infringement.

B. Infringement Determination
Philips argues that the accused products literally infringe the patent claims asserted in this investigation, including the asserted

claims of the '209 and '493 patents. *See,* Philips' Post-Hearing Patent Brief at 15 & n.21; Philips' Post-Hearing Patent Reply Brief at 4-5. Literal infringement of a claim occurs when every limitation recited in the claim appears in the accused device, i.e., when "the properly construed claim reads on the accused device exactly." *Amhil Enters., Ltd. v. Wawa, Inc.*, 81 F.3d 1554, 1562 (Fed. Cir.1996); *Southwall Tech. v. Cardinal IG Co.*, 54 F.3d 1570, 1575 (Fed Cir. 1995). Philips has not argued that the accused products infringe the asserted claims of the '209 and '493 patents, or any of the patents at issue, under the doctrine of equivalents.

With respect to the '209 and '493 patents, Respondents argue that if the claims are interpreted to construe the track width as track pitch, the accused discs do not have a diffractive follow-on track with a width smaller than the dimension of a scanning sport. Respondents also argue that asserted claims cannot be directly infringed because the claims require the use of a recording device (which Respondents do not use), and further there can be no indirect infringement because an end user who purchases a licensed CD recording/reproduction device is licensed to use the device. It is argued that because the end user cannot commit an act of direct infringement, there can be no indirect infringement.[FN31] Additionally, Respondents argue that if the claims are construed to read on only a single-spot push-pull method, there will also be instances in which an end user will have a device that uses a three-spot tracking method, thus providing substantial non-infringing uses.[FN32] *See* Respondents' Post-Hearing Patent Brief at 13-14; Respondents' Post-Hearing Patent Reply Brief at 12.

The Commission Investigative Staff argues that accused products infringe the asserted claims of the '209 and '493 patents. It is argued that the accused products are configured to use a spot of radiation that is wider than the track on the disk, and the asserted claims do not require the use of a recorder or player. OUII Post-Hearing Patent Brief at 16-18.

Respondents' arguments of non-infringement are based on proposed claim constructions that are rejected as inconsistent with the asserted claims. The follow-on track cannot be construed to encompass the track pitch. The claims cover the configuration of a disc, and in order for infringement to occur they do not require that the disc be used in a recorder or player. Finally, the claims are not restricted to a single-beam push-pull method. Rather, an infringing disc may be configured for use with a one-beam system or a three-beam system, as discussed in the patent specifications.[FN33]

Furthermore, Philips' expert provided testimony, based on his tests, showing that the accused discs contain each limitation of the asserted claims, when they are properly construed, including the limitation that the width of the follow-on track must be smaller than a spot of radiation. Philips also presented evidence that Princo and Gigastorage designed their discs so that the width of the groove is smaller than the laser spot expected to be used. *See* Hesselink Tr. 530-532;[FN34] Philips' Post-Hearing Patent Brief at 15 (citing CPFF 249-320).

Consequently, Philips has carried its burden of demonstrating that the accused products directly infringe the asserted claims of the '209 and '493 patents.

C. Validity

A patent is presumed to be valid. 35 U.S.C. § 282; *DMI Inc. v. Deere & Co.*, 802 F.2d 421 (Fed. Cir. 1986). Although a complainant has the burden of proving a violation of Section 337, it can rely upon the presumption of validity, which a respondent must overcome by clear and convincing evidence. *Checkpoint Systems, Inc. v. United States Int'l Trade Comm'n*, 54 F.3d 756, 761 (Fed. Cir. 1995).

Respondents argue that the asserted claims of the '209 and '493 patents are invalid, under 35 U.S.C. ¶ 112, because their specifications fail to enable one of ordinary skill in the art to practice the inventions without undue experimentation, and do not reasonably convey to a person of ordinary skill that the inventors were in possession of the subject matter in the amended claims. They also argue that the asserted claims are invalid under 35 U.S.C. § 103 due to obviousness. *See* Respondents' Post-Hearing Patent Brief at 13-19.

Enablement

Section 112 of the Patent Act provides, in part, that "[t]he specification shall contain a written description of the invention, and

of the manner and process of making and using it, in such full, clear, concise, and exact terms as *to enable any person skilled in the art to which it pertains, or with which it is most clearly connected, to make and use the same*, and shall set forth the best mode contemplated by the inventor of carrying out his invention." 35 U.S.C. § 112, ¶ 1 (emphasis added). "Whether a claim is enabled under 35 U.S.C. § 112, first paragraph is a question of law, although based upon underlying factual findings." *Crown Operations Int'l, Ltd. v. Solutia Inc.*, 289 F.3d 1367, 1376 (Fed. Cir. 2002). The purpose of the "enablement" requirement is to assure that the inventor provides sufficient information about the claimed invention so that a person of ordinary skill in the art can make and use the invention without undue experimentation. *PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1563-65 (Fed. Cir. 1996). A specification is to enable a person of ordinary skill at the time the application was filed. Later discoveries in the art are not relevant to a determination of enablement. *In re Wright*, 999 F.2d 1557, 1562-63 (Fed. Cir. 1993). The enablement requirement is met if the specification enables any mode of making or using the invention. *Engel Indus., Inc. v. Lockformer Co.*, 946 F.2d 1528, 1533 (Fed. Cir. 1991).[FN35]

Respondents argue that the single-spot push-pull tracking method was not publicly known in 1973 when the application underlying the '209 and '493 patents was filed, and that the specifications of those patents would not have enabled one of ordinary skill in the art to practice that tracking method. *See* Respondents' Post-Hearing Patent Brief at 7, 16-18; Respondents' Post-Hearing Patent Reply Brief at 12-15.

Philips argues that the PTO Board has already found that the claims of the '209 patent (which patent, as detailed above, is related to the '493 patent) are enabled, especially in view of the specification's reference to the '582 patent (which, as detailed above, contains information relating to single-beam optics). In addition, it is argued, Philips' expert demonstrated that one-spot diffractive radial tracking does not require the particular system proposed by Respondents. Philips' Post-Hearing Patent Brief at 18-19.

The Commission Investigative Staff argues the enablement requirement is satisfied if a patent's claims enable at least one embodiment of the claimed invention. It is argued that inasmuch as the asserted claims are properly construed to cover the three-beam method, Respondents' lack of enablement defense should fail, regardless of whether or not a one-beam system is also enabled. OUII Post-Hearing Patent Brief at 39; OUII Post-Hearing Patent Brief at 2.

The asserted claims of the '209 and '493 patent are properly construed to have within their scope a record carrier body or disc for use with a three-beam tracking system such as that disclosed in detail in the patent specifications. It appears that no party has contested the fact that the specifications would have enabled such a three-beam method. Indeed, there is no evidence that the specifications would have failed to enable a three-beam method. The law requires that one mode or embodiment of a claimed invention be enabled by a patent specification. At least one mode, the three-beam tracking system, is enabled by the specifications. Consequently, it has not been established by clear and convincing evidence that the asserted claims of the '209 and '493 patent are invalid for failing to comply with the enablement requirement of 35 U.S.C. § 112.

Written Description

The first paragraph of section 112 requires that a patent specification contain a "written description of the invention." The Federal Circuit explained in *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555 (Fed. Cir. 1991), that "[t]he purpose of the "written description" requirement is broader than to merely explain how to 'make and use'; the applicant must also convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession *of the invention*. The invention is, for purposes of the 'written description' inquiry, *whatever is now claimed*." 935 at 1563-64 (emphasis in original). The written description inquiry is factual. *Crown*, 289 F.3d at 1376. "If a person of ordinary skill in the art would have understood the inventor to have been in possession of the claimed invention at the time of filing, even if every nuance of the claims is not explicitly described in the specification, then the adequate written description requirement is met." *In re Alton*, 76 F.3d 1168, 1175 (Fed. Cir. 1996). "Precisely how close the original description must come to comply with the written description requirement must be determined on a case-by-case basis." *Eiselstein v. Frank*, 52 F.3d 1035, 1039 (Fed. Cir. 1995).

As observed by the Federal Circuit, "the 'written description' requirement most often comes into play where claims not presented in the application when filed are presented thereafter ...." *Vas-Cath*, 935 at 1560. Indeed, Respondents argue in this investigation that in May, 1984, Philips amended the claims to recite a record carrier having a diffractive follow-on track and a

system that maintains a write beam in alignment with the follow-on track based on intensity distribution caused by diffraction of the write beam.

In particular, Respondents argue that Philips amended the claims to recite the push-pull tracking system, which was not publically known in 1973 when the application for the '209 and '493 patent was filed. Thus, Respondents argue, by amending the claims in 1984, Philips attempted to claim subject matter that could not have been contemplated or described by the application when filed. In fact, Respondents argue, the deposition testimony of Dr. Pieter Kramer (an inventor listed on the '209 and '493 patents) and Mr. Marino Carasso (an inventor listed on other Philips patents) confirmed that work on the push-pull method did not begin until after the application was filed. Respondents are also critical of Philips' reference in its briefing to U.S. Patent No. 4,491,940 (CX-604), issued to Claude Tinet, to help show that the inventors were in possession of a single-spot method. It is argued that the method described in the '940 Tinet patent is not the push-pull or baseball pattern method, and there is no evidence that the method described in Tinet would have been known to those of ordinary skill in the art or known to Philips when the application leading to the '209 and '493 patent was filed in 1973. *See* Respondents' Post-Hearing Patent Brief at 14-15, 18-19; Respondents Post-Hearing Patent Reply Brief at 12-15.

Philips argues that during prosecution, the PTO Board, reversing the Examiner's rejection of the amended claims, found that the specification adequately conveyed to the artisan that the inventors had in their possession at the time of filing the subject matter covered by the amended claims. It is also argued that Respondents are incorrect in asserting that one-spot diffractive tracking was not known in 1973 when the application was filed. Philips argues that the '940 patent to Tinet describes, without claiming, such a system, and further that Philips learned of this one-spot method in 1972 or 1973 from two companies, Thomson and Zenith. *See* Philips' Post-Hearing Patent Brief at 19.

The Commission Investigative Staff argues that although it is a close question, Respondents have failed to carry their burden of proving by clear and convincing evidence that the inventors were not in possession of a one-spot tracking system at the time that the parent applications were filed for the '209 and '493 patents. In particular, the Staff argues that Philips' technical expert demonstrated that the '940 Tinet patent did show a one-spot tracking system that uses light intensity to track a beam, although it is not the baseball pattern system relied on by Respondents. Furthermore, the Staff argues that the deposition testimony indicates that Philips was aware of the Tinet system as early as 1972 or 1973. *See* OUII Post-Hearing Patent Brief at 36-38; OUII Post-Hearing Patent Reply Brief at 2-4.

Inasmuch as the asserted claims, as properly construed, have within their scope a disc configured for use with a one-beam or a three-beam tracking system, it is necessary that the written description requirement be fulfilled for both systems. This requirement is undisputed. Nor have any questions been raised or evidence presented questioning the '209 and '493 patents' description of a three-beam system. The dispute centers around a one-beam system.

Respondents' argument concerning a one-beam (or single-beam) system is to a large extent based on the particular push-pull or baseball pattern tracking system (with a track width equal to track pitch) to which, they argue, the asserted claims must be limited. As explained at several points in this opinion, that proposed claim construction cannot be adopted. For that and other reasons, Respondents have failed to carry the burden of demonstrating by clear and convincing evidence that the asserted claims fail to satisfy the written description requirement.

The evidence does show that the "baseball pattern" system was not, and is not, the only way to track with a single beam. *See, e.g.*, Hesselink Tr. 2541-2543. Instead, general principles relevant to the use of an intensity distribution that can be used to provide a tracking signal were known at the time that the inventors filed the 1973 application. Hesselink Tr. 2539-2544, 2537, 2612-2614. This is confirmed by the '940 Tinet patent (CX-604), which has an August 1972 priority date. CX-604 ('940 Tinet Patent). The relevance of the '940 Tinet patent is not that Tinet or someone else invented the one-beam tracking system within the scope of the '209 patent. It is to show that the field of optical data storage had progressed to the point where the '209 specification (including its reference to the '582 patent) would convey with reasonable clarity to those skilled in the art that the inventors were in possession of the claimed invention, as it relates to a one-beam tracking system.

A one-spot tracking system is discussed in the '940 Tinet patent, which claims a system for reproducing pulse time modulated waveforms stored along a diffractive track. CX-604 ('940 Tinet Patent). Figure 1 of the '940 Tinet patent shows a one-spot tracking system that operates so that when the beam is off-center, one of the two sensors (**12** or **13** in the Figures) will receive less light and therefore a tracking signal can be generated by comparing the amount of light received by each.[FN36] Hesselink Tr. 2542-2543; CX-604 ('940 Tinet Patent), col. 4, lines 50-56.

In addition, while deposition testimony of present or former Philips inventors indicates that the push-pull or baseball pattern of tracking was not known to Philips in 1973, the deposition testimony of Dr. Jacques Heemskerk, who was integrally involved in the early years of CD development, indicates that as early as 1972 or 1973, Philips was aware that Thomson (the company to which the '940 Tinet patent was assigned) and Zenith had developed other one-spot tracking systems. *See* Heemskerk Dep. (RX-1477C/JX-1C) Tr. 78-79; CX-604 ('940 Tinet Patent).

It has not been established by clear and convincing evidence that the '209 and '493 patent specifications would have failed to convey to one skilled in the relevant art that the inventors were in possession of the invention as claimed in the asserted amended claims, especially as the invention relates to a one-beam tracking system. Consequently, it is not found that the asserted claims of the '209 and '493 patents are invalid for failure to provide a written description as required by 35 U.S.C. 112.

Obviousness

Respondents argue that the '209 and '493 patents are invalid as obvious over the prior art. Pursuant to 35 U.S.C. § 103, a patent may be found invalid if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."[FN37] 35 U.S.C. § 103.

The Federal Circuit has summarized the law relating to obviousness, as follows:

> Obviousness is a legal conclusion based on underlying facts of four general types, all of which must be considered by the trier of fact: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) any objective indicia of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966); *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1270, 20 USPQ2d 1746, 1750-51 (Fed.Cir.1991); *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1566-68, 1 USPQ2d 1593, 1594 (Fed.Cir.1987).
>
> "Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention." *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546, 48 USPQ2d 1321, 1329 (Fed.Cir.1998). There must be a teaching or suggestion within the prior art, within the nature of the problem to be solved, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources, to select particular elements, and to combine them as combined by the inventor. *See Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 665, 57 USPQ2d 1161, 1167 (Fed.Cir.2000); *ATD Corp.*, 159 F.3d at 546, 48 USPQ2d at 1329; *Heidelberger Druckmaschinen AG v. Hantscho Commercial Prods., Inc.*, 21 F.3d 1068, 1072, 30 USPQ2d 1377, 1379 (Fed.Cir.1994) ("When the patented invention is made by combining known components to achieve a new system, the prior art must provide a suggestion or motivation to make such a combination.").

Crown, 289 F.3d at 1375-76.

Respondents argue that it would have been obvious to one of ordinary skill in the art in 1973 to use the optical recording system disclosed by U.S. Patent No. 3,673,412 (RX-68), issued to Olson, with the disc-shaped record carrier taught by U.S. Patent No. 3,287,563 (RX-67), issued to Clunis.[FN38] *See* Respondents' Post-Hearing Patent Brief at 6, 19-21.

Philips argues that the '209 patent issued over Olson, which was considered by the PTO; that Olson does not use diffraction for tracking; that Olson does not use or teach any form of diffraction for radial tracking; that Olson's detection method could not use diffraction for radial tracking; that Respondents' arguments about Olson are incorrect and irreconcilable with their proposed construction of the '209 and '493 patents; and finally that Olson and Clunis cannot be combined. Philips' Post-Hearing Patent Brief at 19-24.

The Commission Investigative Staff argues that Olson does not use diffraction to keep a laser on track, and further that the spot of radiation in Olson is not smaller than the track width as the '209 and '493 patents require. OUII Post-Hearing Patent Brief at 28-31; OUII Post-Hearing Patent Reply Brief at 4-6.[FN39]

Olson was considered by the PTO Examiner during prosecution of the '209 patent. The Examiner had initially rejected the original claims of the application for, among other things, section 103 obviousness based on Olson. At the time the Applicants amended their claims, they also argued that Olson lacked a "diffractive follow-on track of the type defined by the claims." CX-37 ('209 Patent Prosecution History), Paper No. 5, Amendment and Remarks at 11).[FN40] The Examiner subsequently did not include Olson in his final rejection, and Olson had been dropped as a reference when the PTO Board considered the Applicants' appeal. *See* CX-37 ('209 Patent Prosecution History), Paper No. 6, Paper No. 17. It is noteworthy, however, that in allowing the '209 patent to issue over other obviousness rejections made by the Examiner, the PTO Board recognized that the use of diffraction from a follow-on track by a spot wider than the track is a critical limitation of the claimed invention. The Board did not find such a track disclosed in the prior art before it on appeal. CX-37 ('209 Patent Prosecution History), Paper No. 17, PTO Board Decision at 10).

Whether Olson discloses the use of a diffractive track was addressed during patent prosecution before the Examiner, and it remains central to the question now raised by Respondents of whether the asserted claims of the '209 and '493 patents are invalid as obvious.

Olson discloses a tracking system in which data is recorded in a data track (for example, patent Fig. **108**) located between two separated portions of a photographically recorded servo track (depicted in the specification as **36**, divided into **36A** and **36B**), each portion of which generates a signal of a different fixed frequency or "pilot tone" when light is transmitted through it and the tracks are spinning. In the example disclosed in Olson, 14 kHz and 16 kHz are used. CX-68 (Olson Patent), col. 4, lines 54-64, col. 5, lines 9-11, col. 8, lines 45-47; Hesselink Tr. 2546-2547. When the beam is centered on the track the frequencies of the two servo tracks have equal amplitudes. CX-68 (Olson Patent), col. 5 lines 29-34; Hesselink Tr. 2547. However, if the beam moves off to one side, the amplitudes of the frequencies become different, and the tracking system adjusts the beam until the amplitudes are equal again. CX-68 (Olson Patent), col. 5 lines 34-40; Hesselink Tr. 2547.

Several characteristics of the Olson servo tracks demonstrate that the system does not use diffraction for tracking. The difference in shading on a servo track (sometimes referred to as the "grating") varies in the vertical direction (vertical in reference to Figure 5).[FN41] Hesselink Tr. 2638; SX-10. Thus, assuming for the sake of argument that diffraction occurs, it must occur in the vertical direction, because any differences in amplitude or phase of the light caused by the reaction to the differences in shading of the photographic materials occur in the vertical direction (perpendicular to the grating). Hesselink Tr. 2550. The system, however, requires tracking in the horizontal direction and inasmuch as the material is uniform in the horizontal direction, any lateral movement of the beam will not result in a difference in light intensity such that diffraction could be used for tracking. *Id.* Further evidence that Olson does not use diffraction is that the tracking system in Olsen does not work unless the carrier moves in relation to the beam. *See* Mansuripur Tr. 1366. Yet, the occurrence of diffraction does not depend upon movement of the carrier in relation to the beam. Hesselink Tr. 2552; Mansuripur Tr. 1365.

Respondents argue that diffraction is disclosed in Olson because the servo tracks will overlap with the data track, so the scanning spot will diffract from the interaction with the pilot tones on the data track, and the scanning spot will be wider than the width of the data track. *See* Respondents' Post Hearing Patent Brief at 19-20.

The Olson specification does state that in the Figures, the "servo and data tracks ... are shown to have distinct boundaries only for convenience of illustration and that the recorded signals which actually define these tracks will overlap." RX-68 (Olson Patent), col. 9, lines 23-27. However, the type of overlap that Respondent rely on was described at the hearing to mean that the three tracks are "subsumed" into one track, thus making their width smaller than the size of the spot.[FN42] *See* Mansuripur Tr. 1119-1120, 1363-1364. While such an argument might be necessary to provide any basis for believing that Olson discloses a diffracting track, it is not convincing, and moreover appears to be impossible as a practical matter.[FN43] *See* Hesselink Tr. 2549.

Even if Olson did teach merging the servo tracks with the data track to create a single diffractive follow-on track, which it does not, the overlapping of the servo tracks and the data track would result in an inoperable system. Hesselink Tr. 2553-2554 ("So the tracking system would be completely confused by the data that was stored on here because they completely overlap, and the net result is a very strong reaction. This cannot work. There's absolutely no way that this system can work.").

Inasmuch as Olson does not disclose the required diffractive track, the combination of Olson and Clunis proposed by Respondents cannot supply all the elements of the claimed invention. Nevertheless, assuming *arguendo* that a diffractive track were disclosed, and Clunis were relied upon because it is a disc-shaped carrier, the evidence does not show that Respondents would have carried their burden of showing the asserted claims to be obvious.

The Clunis patent, which issued in 1966, "relates to a transducing medium. More specifically, the invention relates to the recording and reproduction of information on a thermoplastic medium." "The invention ... incorporates means to control the tracking of light energy during reproduction." CX-67 (Clunis Patent), col. 1, lines 9-11. col. 2, lines 6-7. Clunis discloses the rotation of a disc, and a type of groove, although it does not appear to have a pre-existing groove for guiding the beam during recording. *See* RX-67 (Clunis Patent), col. 2, lines 6-30, col. 4, line 56 through col. 5, line 19, col. 5, lines 28-44. Moreover, Respondents have identified no motivation to combine Clunis and Olson, other than the fact that it was well known to use round discs if one wanted the medium to move, as for example, in the case of phonograph records. *See* Respondents' Post-Hearing Patent Brief at 21-22; Mansuripur Tr. 1120-1121. In this case, more evidence would be needed in order to demonstrate that one would have been motivated to combine Olson and Clunis to have obtained the invention of the asserted claims.

In summary, Respondents have not established by clear and convincing evidence that the asserted claims of the '209 and '493 patents are invalid as obvious in view of the prior art.

IV. THE '401 PATENT

A. Claim Construction

The '209 and '493 patents discussed above in this Initial Determination, address the problem of determining whether radiation in the form of a spot or beam, such as a laser beam, is positioned correctly on a disc with respect to its radial position on a track, such as a groove. For example, one should be able to tell whether, due to imperfections in the spinning of a disc, a laser beam is skewed toward the center of the disc or toward the outer edge of the disc rather than in the center of the track where the information is to be recorded or read.

More information is, however, needed to read or write on a disc. For example, when writing on a recordable disc, it is important to synchronize the writing of the information with the rotation of the disc and the position of the laser beam along the length of the track. *See* Hesselink Tr. 541-542. The four remaining patents at issue in this investigation, the '401, '856, '825 and '764 patents, address such concerns, and the discussions of each of these patents in the parties' briefs often overlap.

United States Patent No. 4,972,401, entitled "Optically Readable Record Carrier with Track Undulations for Producing a Synchronizing Clock Signal and Apparatus for Forming Such a Track" issued on November 20, 1990, to Marino G. Carasso and Johannes J. Verboom of the Netherlands.[FN44] CX-14/RX-60 ('401 Patent). The '401 patent is the first of the four remaining patents to issue, and is the patent with the earliest priority date. It discloses and claims "a radial 'wobble' in the groove-shaped track" or "periodic undulations" in the groove of a blank disc, with such modulation constituting a clock signal for synchronizing the recording and/or reproduction of information on the disc by controlling the velocity at which the disc is rotated. *See, e.g.*, CX-14/RX-60 ('401 Patent), col. 2, lines 29-37.

When scanned with the write laser, the track wobble generates a signal having a frequency corresponding to the shape of the wobble. This signal serves as a "clock" by which an apparatus can synchronize the recording or reading of information on the disc. Inasmuch as the wobble is part of the entire pre-groove before user data is encoded on the disc, the wobble is present and provides a clock signal everywhere on the track. Furthermore, independent claim 1 of the '401 patent provides that the frequency of the wobble clock should not interfere with the frequency of the digitally-encoded user information. Hesselink Tr.

544-545, 547; CX-14/RX-60 ('401 Patent), col. 2, lines 47-57, col. 7, lines 41-46, Fig. 4.

The '856, '825 and '764 patents disclose and claim further modulation of the wobble, using frequency modulation,[FN45] to encode additional information in the pre-groove that does not interfere with the wobble clock. The '856 patent describes, among other things, an optical recording system that uses frequency modulation of the track undulations to encode position information signals, *i.e.*, signals that let the system know where along the track the laser is positioned. *See* CX-15/RX-61 ('856 Patent), col. 2, lines 34-38. The '825 patent is a refinement of the '856 patent, and it provides a better means for synchronizing signals during the recording process. The inventions of the '856 and '825 patents are intended to be particularly useful when EFM-encoded information is recorded on the disc.[FN46] In those cases, it is important to have a continuous data stream without the interruptions caused by the use of bit structures at certain, intermittent locations on the disc to serve as headers, as in previous technologies. *See* Hesselink Tr. 541-542, 578, 587-588; CX-15/RX-61 ('856 Patent), col. 2, lines 14-33; CX-17 ('825 patent), col. 2, lines 6-21. Finally, the '764 patent involves the encoding of information into the track undulation other than position code information, such as the proper laser power to use when writing on a particular disc (unasserted claim 21) and the location of the table of contents on the disc (asserted claim 26). *See* Hesselink Tr. 644-645; CX-16/RX-57 ('764 Patent).

With respect to the '401 patent, Philips asserts independent claim 1 and dependent claims 2 and 3, which are, as follows:

> **1**. A record carrier for storing digitally coded information having a fixed bit frequency and a power spectrum with a substantially zero level at a predetermined frequency, which information is recorded on and/or reproduced from the record carrier by scanning with a beam of radiation, said record carrier comprising:
>
> a substrate provided with substantially parallel elongated tracks each having a periodic undulation in a direction transverse thereto at said predetermined frequency, so that during scanning of any portion of a track by said scanning beam to record and/or reproduce information thereon a beam of radiation is produced therefrom which is periodically modulated at said predetermined frequency, such modulation constituting a clock signal for synchronizing the recording and/or reproduction of said information on said track portion; and
>
> a radiation-sensitive layer provided on said tracks, said layer being adapted to be modified by said scanning beam so as to record said digitally coded information on said tracks.
>
> **2**. A record carrier according to claim **1**, wherein said record carrier is disc-shaped and said tracks are substantially concentric about a center of rotation of said disc, the periodic undulation of said tracks being in the radial direction with respect to such center of rotation.
>
> **3**. A record carrier according to claim **1,** wherein said record carrier is disc-shaped and said tracks are successive turns of a continuous spiral about a center of rotation of said disc, the periodic undulation of said tracks being in the radial direction with respect to such center of rotation.

CX-14/RX-60 ('401 Patent), col. 17, line 8 through col. 18, line 3.

There are two disputes surrounding the construction of these asserted claims. First, there is a question as to the proper interpretation of the claim term "periodic." Second, a question is raised as to whether the asserted claims apply only to a "record carrier" (or disc) when it is operating in a recording device. Respondents propose an interpretation for the term "periodic," and further argue that the claims cover only a disc operating in a recording device. Respondents' proposed interpretations are opposed by Philips and by the Commission Investigative Staff.

The Claim Term "Periodic"

The term "periodic" is contained in independent claim 1 of the '401 patent, and also in one or more asserted claims of each of the '856, '825 and '764 patents.[FN47] The parties rely on claim language and specification text that is unique to the four individual patents, and also on similarities in the claims and specifications.[FN48] Indeed, the parties' post-hearing main and reply briefs often address the term "periodic" collectively for the four patents. Although Respondents' proposed interpretation of the term "periodic" differs from that proposed by Philips and the Commission Investigative Staff, all the parties agree that the term should be construed consistently for the '401, '856, '825 and '764 patents. *See* Philips' Post-Hearing Patent Brief at 4-8; Respondents' Post-Hearing Patent Brief at 22-23, 31-32, 37, 44; Respondents' Post-Hearing Patent Reply Brief at 5-8; OUII Post-Hearing Patent Brief at 13-15 ('401, '856 and '835 patents), 23 ('764 patent).[FN49] The Administrative Law Judge finds that such a consistent interpretation of the claim term "periodic" is supported by the claims, specifications and prosecution histories of those patents. It is therefore logical and efficient that in this Initial Determination, the discussion of the claim term "periodic"

involves all four patents.

Respondents argue that the term "periodic" is properly construed for the '401, '856, '825 and '764 patents to mean "repeating itself identically at regular intervals, subject to acceptable tolerances from perfect periodicity due to noise or manufacturing imperfections." *See, e.g.*, Respondents' Post-Hearing Patent Brief at 44. Respondents argue that their proposal is supported by a technical dictionary definition of the term, and would be understood as the correct interpretation by one of ordinary skill in the art. Drawing on information contained in the patent specifications (especially the '856 patent specification), Respondents argue that the acceptable tolerance from perfect periodicity is 100 Hz, or +/- 50 Hz.

Philips argues that Respondents' proposed interpretation of the term "periodic" must be rejected because it conflicts with the understanding of those skilled in the art, as well as with the purposes and teachings of the patent specifications, which depend upon and disclose frequency modulation outside the tolerances allowed by Respondents.

The Commission Investigative Staff argues that the term "periodic," as used in the asserted claims, should be understood to mean "regularly, though not necessarily identically repeating." *See* OUII Post-Hearing Brief at 14, 23. In particular, it is argued that the 100 Hz bandwidth relied upon by Respondents does not refer to the wobble signal, and further that a frequency modulation with a bandwidth of +/- 1kHz to +/- 1.5 kHz, as described in the '856, '825 and '764 patents should be understood to be within the claims. The Staff argues that to construe the claims in the manner proposed by Respondents would have the claims read on systems that would not work, and would render the claims nonsensical.

The question of whether Respondents' proposed claim construction would in fact render some or all of the asserted claims nonsensical is an important point to consider. *See, e.g., Modine Mfg.*, 75 F.3d 1545, 1557 ("When claims are amenable to more than one construction, they should when reasonably possible be interpreted so as to preserve their validity.").

Although Respondents argue that the '401, '865, '825 and '764 patents are invalid due to obviousness, anticipation, and failure to disclose the best mode, Respondents do not highlight in their briefs whether, under their proposed interpretation of the term "periodic," some or all of the asserted claims are nonsense. This question was, however, raised directly with Respondents' technical expert at the time he testified as to his understanding of the claims. Respondents' expert found that there was no way to reconcile his interpretation with the claims of the '856 patent and the '825 patent. The pertinent hearing testimony, elicited by Respondents' counsel on direct examination, is as follows:

> Q Let's take a look at the claims of the '856 patent. Have you formed an opinion as to the proper interpretation of the claims of the '856 patent, Dr. Mansuripur?
>
> A Yes, I have.
>
> Q You've reproduced here claim 1 along with some text from the specification, looking at RX-2232.1, and you've highlighted the term "periodic." Can you explain your interpretation of that term?
>
> A Yes. Well, as I have said before, periodic is a technical term and it has a proper interpretation, and I used the same interpretation in this case. And in fact, there is support for that interpretation in the first half of the claim, as I will explain.
>
> So the claim language says "each of said tracks has a periodic modulation of its position in a direction transverse thereto." So this is a wobble or width modulation of the tracks, and it says it is periodic. "And which, without occupying any portion of the track," meaning that it leaves room for data to be stored in the same track that is wobbled. So that is what it means "without occupying any portion of the track." It generates a periodic clock signal. So this wobble is going to now generate a periodic clock signal. Sure, the clock signal is periodic, and as I have said and as the specification says, the reference frequency is approximately 22 kilohertz, and it says the signal bandwidth which should be about 100 hertz. So this tells me that periodic means 22 kilohertz, plus minus 50 hertz. That's the range of acceptability for the periodic clock signal. "Periodic clock signal in the radiation there from having a substantially constant frequency," which is consistent with this. It says 22 kilohertz, but it can vary within plus/minus 100 hertz.
>
> So that's constant. It's periodic and substantially constant. I understand that. "Corresponding to the velocity of the scanning of said tracks, the frequency of said clock." This is the said clock. "Clock signal only," and this is an important word, only" - "varying in accordance with variations in said scanning velocity." So it says if the scanning velocity of the disc, if the rotation rate of the disc is constant, then the frequency of this clock should be constant

because it only varies when the velocity varies. So I understand it to be periodic as it should be. That's the proper definition of the term "periodic."

So the frequency of said clock signal, which was said to be periodic, "only varying in accordance with variations in said scanning velocity." So far, it's so good, it's consistent. But then it goes on and says "and in that the frequency of said clock," that's this clock which is supposed to be constant if the velocity is constant, "is modulated in accordance with a digital position signal."

Now, if this frequency is supposed to be constant, how could it be modulated with the 1 kil -- plus one kilohertz and the minus one kilohertz signal. It's only supposed to be plus minus 50 hertz, as it said. So the frequency of said clock signal is modulated in accordance with the digital position signal which identifies the position of said tracks. *So here is the dilemma. There is a contradiction here. On the one hand it says it should be periodic and only varying if the velocity changes, on the other hand, it says it should be modulated, so it should vary in frequency by a large amount.*

Q *Now, is there any way to make sense of the claim as it's written, Dr. Mansuripur*?

A *Well, if I were to cross out the word "periodic" from here or make it nonperiodic" and if I were to cross out -- instead of "said clock signal," say something else, like the wobble signal, then it would become consistent. Then it would make sense*.

Q You don't believe you have the authority to change the claim after it was issued; is that correct?

A That's my understanding of the law. You are not supposed to change the claim language.

Q You just interpret it as it is written; correct?

A That's correct.

JUDGE HARRIS: Is it your view -- is it your opinion that the person who wrote this claim did not understand the technology?

THE WITNESS: I really can't judge whether the person knew the technology or not, but I think it's a lack of understanding of how this frequency modulation is supposed to work. It seems like they think the frequency modulation somehow gets into the signal without changing the clock signal outside its allowed range.

Mansuripur Tr. 1179-1182 (emphasis added).

Shortly thereafter, with respect to the '825 patent, Respondents' technical expert again testified that the claims did not make sense, as follows:

Q Does the '825 patent specification make sense of this claim, Dr. Mansuripur?

A I think it's the same thing in the specification. Where the word "periodic" is used in conjunction with the modulation of the track, it is inconsistent with the fact of the modulation. So if you cross out the word "periodic" from the specific places in the spec, then it becomes consistent.

Q So the interpretation of "periodic" that you ascribe to the '825 and '856 patent is consistent with the interpretation that you described in the '401 patent; correct?

A The interpretation of the word "periodic" here is consistent across the board.

Mansuripur Tr. 1196-1197.[FN50]

Respondents' expert admitted at the hearing that given his understanding of the term "periodic," as used in the '401 and subsequent patents at issue, he could not make sense of at least some of the asserted patent claims. Yet, neither the asserted patent claims nor their specifications require or allow a construction that renders the claims nonsensical.[FN51]

As indicated above, the '401 patent discloses and claims "wobbling" of the groove, or "pre-groove" on the blank disc, and the specification and claims describe the groove as having physical "periodic undulations" molded into the blank disc. The '401 patent also describes the signal generated by the wobble when the disc is scanned by the laser for recording or writing as being "periodically modulated," and that "such modulation constituting a clock signal for synchronizing the recording and/or reproduction" of information on the disc by controlling the velocity at which the disc is rotated. CX-14/RX-60 ('401 Patent), col. 17, lines 20-24.

While the '401 patent provides that the clock signal aids in synchronization of data that are recorded on, or reproduced from a disc, there is no indication in the patent that in the relevant art such a clock signal is useful only if the undulations have the type of mathematical or identical periodicity proposed by Respondents.[FN52]

It is also clear from the '401 patent's prosecution history that "periodic undulation" as claimed in the patent need not identically repeat. For example, the Examiner cited "Bouwhuis et al. and Watson ... to show other apparatus which teach utilizing optical information tracks with periodic undulations." *See* CX-38/RX-95 ('401 Patent Prosecution History), Paper No. 5, Rejection at 4 (citing U.S. Patent No. 4,223,347 to Gijsbertus Bouwhuis and Pieter Kramer, and U.S. Patent No. 3,931,460 to William Watson). However, the periodic undulations disclosed in the '347 patent to Bouwhuis et al. and the '460 patent to Watson are not identical. Those periodic undulations disclosed in the prior art vary, and are indeed intended to vary at different locations on the disc. *See* Hesselink Tr. 555-557 (explaining that in the cited '460 and '347 patents, as the radius across the surface of the disc increases, so do the wavelengths of the "periodic undulations").

The '856, '825 and '764 patents disclose and claim frequency modulation to encode information in the shape of the pre-groove that is additional to (but not interfering with) the wobble clock. These patents describe frequency modulation of the wobble signal in conformity with a digital signal representing either track position or "auxiliary" information, such that one frequency represents the logical value "1" and another frequency represents the logical value "0." *See* Hesselink Tr. 2567. The result of frequency modulation in this case is that the wobble signal acquires two instantaneous values -- 21.05 kHz and 23.05 kHz -- with the mean frequency remaining that of the non-FM modulated wobble clock. *See, e.g.*, Hesselink Tr. 2568-2570; Mansuripur Tr. 1277-1279.

Claim 1 of the '856 patent specifically states that the periodic clock signal has a "substantially constant" frequency, rather than a constant frequency. CX-15/RX-61 ('856 Patent), col. 7, lines 1-2; Hesselink Tr. 578-579. The claim language plainly requires that the frequency of the clock signal must be modulated in accordance with a digital position signal that identifies the relative positions of the tracks on the record carrier. Thus, the claim is clear that the clock signal is frequency modulated to identify the relative locations on the track. Hesselink Tr. 571-572; CX-15, col. 7, lines 5-8; CX-593C, '856 Illustration Slides 5-7).

The prosecution history also addresses the term "substantially" as used in relation to the term "constant." The prosecution history demonstrates that in this instance, the term "substantially" is used to indicate that the claim does not require an identically constant signal. Rather, as recited in the claim, it requires the frequency of the clock signal to be modulated. For example, Remarks made on behalf of Applicants include the following:

> In the claimed record carrier and associated apparatus the clock signal has a frequency corresponding to the track scanning velocity, which is *substantially constant. Consequently, the clock frequency is also substantially constant and only changes in accordance with variation in scanning velocity. However, such frequency is modulated by a digital position signal identifying track position. The clock signal is therefore the mean frequency of the resulting frequency modulated signal*. This is explained in the specification ...."

CX-39/RX-96 ('856 Patent Prosecution History), Paper No. 23 at 2 (emphasis added).[FN53]

Respondents assert that in the context of the '856, '825 and '764 patents, the acceptable tolerance is +/- 50Hz from the 22.05 kHz frequency of the wobble clock. *See, e.g.*, Respondents' Post-Hearing Patent Brief at 31-32; Mansuripur Tr. 1180-1185, 1196-1197, 1226. Yet, such a tolerance is not a suitable bandwidth for the type of frequency modulation required by the claims. The portion of the '856 specification that mentions 100 Hz (+/- 50 Hz) is the following:

> Satisfactory results in recording EFM encoded signals in conformity with the compact disc standard have been obtained for an fref[FN54] of approximately 22 kHz, a bit fr[e]quency of the position-information signal of approximately 3000 bits/second, and a velocity-control clock signal bandwidth of approximately 100 Hz.

CX-15/RX- 61 ('856 Patent), col. 5, lines 56-61.[FN55]

As pointed out by the Commission Investigative Staff and as explained by Philips' technical expert at the hearing, the bandwidth of 100 Hz referred to in the patent specifications is related to the control by a motor in an apparatus, which because it is a physical device with inertia, cannot change speed quickly. These limitations translate into the velocity control frequency having a limited bandwidth of 100 Hz. In contrast, the wobble signal is modulated with a bandwidth of approximately +/- 1kHz. This is taught by the patent specifications. *See* Hesselink Tr. 2570-2574, CX-17 ('825 Patent), col. 18, lines 15-16 ("Further it is to be noted that the frequency swing is suitable of the order of magnitude of 1 kHz"); CX-15/RX-61 ('825 Patent), col. 4, line 64 though col. 5, line 3 ("a frequency excursion of 1.5 kHz proves to be adequate").[FN56] Indeed, the expert testimony in this

investigations confirms that with an approximately +/- 1kHz modulation scheme in the wobble, the system works, yet if the bandwidth of the wobble frequency was limited to 100 Hz the system would simply not work. Hesselink Tr. 2570-2574; Mansuripur Tr. 1379-1380.

The patent specifications clearly distinguish between the velocity control signal that controls the motor and the frequency modulated wobble signal. For example, the '825 specification plainly states that "the center frequency" of the FM-modulated wobble can be used for "measuring the scanning velocity for the purpose of scanning velocity control." CX-17 ('825 Patent), col. 2, lines 57-60. Further, the '825 specification teaches that this center frequency is 22.05 kHz. CX-17 ('825 Patent), col. 3, lines 37-56. The specification also refers to the frequency-modulated wobble signal having a 1 kHz "frequency swing" around the "average frequency of the FM-modulated signal" which "is exactly equal to" the 22.05 KHz of the clock signal used for velocity control. CX-17 ('825 Patent), col. 18, lines 15-16, col. 17, line 65 through col. 18, lines 2 ("Moreover, it is to be noted that on account of the d.c. component of the position-information signal the average frequency of the FM-modulated signal is exactly equal to the 22.05 kHz, which means that the velocity control is influenced to a negligible extent by the FM modulation.").

Although there are variations in language, the patent claims of the '856, '825 and '764 patents describe an FM-modulated signal, and the specifications of each patent contain clear, frequently extensive, language that describes the use of frequency modulation. The specifications explain that the resulting modulation of the pre-groove wobble exhibits two instantaneous frequencies -- one at 21.05 kHz and one at 23.05 kHz -- with the mean at the 22.05 kHz frequency wobble clock, such as that described in the '401 patent, that controls the velocity of disc rotation. *See* CX-15/RX-61 ('856 Patent), col. 4, line 59 through col. 5, lines 3, col. 5, lines 25-55.

It is understood by those of skill in the art that the FM signals such as those described in the '856 and '825 patents are in fact "periodic." *See* Hesselink Tr. 579, 2574; Kablau Dep. (JX-1C) Tr. 205. Such signals generally have well-defined, if not relatively small, frequency ranges. As already discussed, in the '856 patent, which details the use of FM modulation to encode position information into the wobble, the instantaneous frequency is described as varying within a bandwidth of +/-1.5 kHz. Hesselink Tr. at 580-581; CX-15/RX-61 ('856 Patent), col. 4, line 65 though col. 5, line 3.

It is clear that Respondents' argument concerning the claim term "periodic" ignores the understanding of those in the art regarding frequency modulation, and the intrinsic evidence. As Respondents admit, frequency modulating the wobble with a +/- 50 Hz bandwidth, would produce an unusable signal. Yet, they would impose on the FM-modulated signal the same, very limited +/- 50 Hz tolerance they impose on the velocity clock. *See* Mansuripur Tr. 1180, 1380-1381. Respondents' proposed construction of the term "periodic" must be rejected.

There is no requirement that the "periodic" undulation or modulation of the asserted claims be limited in a manner so as to render any of the claims nonsensical. The term "periodic" as used in the '401, '856, '825 and '764 patents refers to undulation or modulation that occurs throughout the spiral track, and within the bandwidths (e.g., +/- 1 kHz or +/- 1.5 kHz) necessary for implementing the inventions as disclosed and claimed therein.

Whether the Claims Require the Use of a Recorder

Respondents argue that all asserted claims of the '401, '856, '825 and '764 patents require a record carrier operating in a recording device. With respect to the '401 patent, Respondents argue that the "predetermined frequency" recited in claim 1 represents a time frequency (measured in cycles per unit time), as opposed to a spatial frequency (measured in cycles per unit distance). It is argued that the track undulations themselves do not possess any time frequency characteristics - rather, it is the signal generated in the reflected radiation from a spinning disc that has time frequency characteristics. Further, Respondents argue, the claim language "*during scanning* of any portion of the track by said scanning beam ... a beam of radiation is produced therefrom which is periodically modulated at said *predetermined frequency* ..." requires the operation of a recorder.[FN57] Respondents' Post-Hearing Patent Brief at 24-24. Respondents' Post-Hearing Patent Reply Brief at 11 (citing Carasso Dep. (JX-1C) Tr. 149-150).

Philips argues that the '401, as well as the '856, '825 and '764 patents, disclose and claim a recording medium having certain physical features, including the track on the disc whose wobbled shape has been altered through modulation to carry information that can be used by a device, yet which nonetheless exists regardless of whether it is used. It is further argued that even if Respondents were correct that the asserted claims include CD recorders, Respondents would nevertheless be liable for contributory infringement under 35 U.S.C. §§ 271(c), because their discs are knowingly designed for use in the combination that they contend is claimed (i.e., a CD recorder-disc "system") and have no substantial non-infringing uses. Philips' Post-Hearing Patent Brief at 8-10.

The Commission Investigative Staff argues that the term "predetermined frequency" as used in claim 1 of the '401 patent refers to a spatial frequency in terms of cycles per distance, and in accordance with the rest of the claim language concerning the physical characteristics of the record carrier, and the specification which provides that the invention is "based on the recognition that in the case of digital recording it is possible to *prerecord a frequency* ... on the record carrier." It is argued that there is a simple linear relationship between the undulations of the track and the 22.05 kHz signal that is derived when the disc rotates at its standard speed, accordingly, no recorder or player is required to meet this claim limitation. OUII Post-Haring Brief at 20.

The asserted claims of the '401 patent (i.e., independent claim 1 and dependent claims 2 and 3) are each written to cover "a record carrier," and independent claim 1 recites "*[a] record carrier* for storing digitally coded information having a fixed bit frequency and a power spectrum with a substantially zero level at a predetermined frequency, which information is recorded on and/or reproduced from the record carrier by scanning with a beam of radiation comprising...." CX-14/RX-60 ('401 Patent), col. 17, line 8 through col. 18, lines 3. By their plain language, the asserted claims have within their scope only a record carrier having specified enumerated limitations. The claims describe how the claimed record carrier would act "during scanning," yet the claims are not apparatus claims.[FN58]

As indicated in the language of claim 1, the record carrier is for the storage of digitally coded information at a predetermined frequency. In support of the claims, the specification of the '401 patent states that "*[t]he invention is based on the recognition that in the case of digital recording it is possible to prerecord a frequency* which is in synchronism with the bit frequency of the data signal to be recorded *on the record carrier* ...." CX-14/RX-60 ('401 Patent), col. 2, lines 38-47 (emphasis added). Thus, the specification recognizes that the configuration of a record carrier, such as a disc, can in fact record or "prerecord" information at a predetermined frequency.

As explained during the hearing by Philips' technical expert, there is a simple linear relationship between the undulations of the track and the signal that is derived when the disc rotates at its standard speed. Thus, in order for a predetermined temporal frequency to be generated, the track wobble must have a predetermined spatial frequency. However, no recorder or player is required to meet this claim limitation. *See* Hesselink Tr. 549-550, 560-561. Contrary to the arguments made by Respondents, the asserted claims of the '401 patent do not require the use of a recorder.

B. Infringement Determination

Philips argues that Respondents' accused discs directly infringe the asserted claims of the '401 patent, as confirmed by tests performed by Philips and Respondents which show that the instantaneous frequency of the wobble signal is +/- 1 kHz due to the address and auxiliary codes that are the subject of the '856, '825 and '764 patents. Philips argues that infringement is also confirmed by Respondents' admission that the accused discs comply with Orange Book standards. Indeed, it is argued, Respondents' accused disks work in a player, and thus there must be a wobble clock that remains periodic. Philips' Post-Hearing Patent Brief at 25.

Respondents argue that their accused discs do not infringe the asserted claims of the '401 patent because the discs do not exhibit "periodic" undulations, given their proposed interpretation of the term "periodic." It is argued that rather than a "predetermined frequency," the tracks in the accused discs exhibit a deliberate modulation (due to the inclusion of address and control information) of 22.05 kHz +/- 1 kHz, which is 20 times greater than the +/- 50 Hz tolerance that they argue should be allowed from perfect periodicity. Respondents also argue that due to the allegedly non-periodic nature of the radiation reflected from a spinning accused disc, the signal cannot be used as a clock signal to synchronize the rate at which digital bits of information are recorded onto or read from an optical disc. Finally, Respondents argue that inasmuch as the asserted claims require a record

carrier and a recording or reproduction device, there can be no infringement. *See* Respondents' Post-Hearing Patent Brief at 25-27; Respondents' Post-Hearing Patent Reply Brief at 12.

The Commission Investigative Staff argues that Respondents' accused discs directly infringe the asserted claims of the '401 patent, when the claims are properly construed. OUII Post-Hearing Patent Brief at 18. The Staff argues the +/- 1 kHz frequency modulation from a carrier frequency of 22.05 kHz is a small deviation that does not change the fact that the accused discs have a wobble in the track with regularly repeating (i.e., "periodic") frequencies. *Id.* at 19. It is further argued that the undulation in the accused products do in fact constitute a clock signal because a clock frequency can be obtained from the undulations in Respondents' discs. *Id.* at 19 (citing Hesselink Tr. 561). Finally, the Staff argues that the accused products have undulations at "said predetermined frequency," inasmuch as that term refers to the physical characteristics of the disc, given the simple linear relationship between the undulations of the track and the signal that is derived when the disc rotates at its standard speed. *Id.* at 20.

As shown by the parties' arguments, there is no dispute concerning the physical characteristics of the undulations or wobble in Respondents' products. Nor is there any dispute concerning the frequency generated by the wobble at a standard speed, including its variation (i.e., 22.05 kHz +/- 1 kHz). The question of whether there is direct infringement of the asserted claims by the accused discs pertains only to the correct construction of the asserted claims, particularly with respect to the term "periodic," and the issue of whether the claims require the use of a recorder or player for there to be infringement.[FN59] Respondents' proposed interpretation of the asserted claims has been rejected with respect to both the proper understanding of the term "periodic," including the nature of the wobble clock, and the issue of whether the claims require that the claimed record carrier or disc be operating in a device.

It has been demonstrated in this investigation, by at least a preponderance of the evidence, that Respondents' discs directly infringe the asserted claims of the '401 patent.

C. Validity

Respondents argue that the asserted claims of the '401 patent are invalid because (1) they are obvious in view of the prior art, and (2) the best mode of practicing the claimed invention is not disclosed in the '401 patent specification. *See* Respondents' Post-Hearing Patent Brief at 27-31; Respondents' Post-Hearing Patent Reply Brief at 18-19. Respondents' arguments are opposed by Philips and by the Commission Investigative Staff. *See* Philips' Post-Hearing Brief at 25-29; Philips' Post-Hearing Patent Reply Brief at 5-9, 14-19; OUII Post-Hearing Patent Brief at 31-33, 39-41; OUII Post-Hearing Patent Reply Brief at 6-8.

Obviousness[FN60]

As presented in their main post-hearing brief, Respondents' obviousness argument is grounded in Philips' Digital Optical Recorder system (or "DOR system"), which apparently grew out of Philips' desire in the mid-1970s to implement a digital recordable optical disc system as an innovation over Philips' analog video long play (often referred to as "VLP") already in existence for recording audio and video.[FN61] The DOR system was described in a paper entitled "Ten Billion Bits on a Disk," by Bulthuis et al.,[FN62] published in the *IEEE Spectrum* in August 1979 (RX-63).

Respondents argue that the Bulthuis article discloses an optical disc having a spiral pregroove on which digital bits of information may be recorded by scanning the groove with a modulated laser beam and melting holes, or pits, in a tellurium-based recording layer. Respondents further argue that by the time the application for the '401 patent was filed, it was recognized by persons skilled in the art that clock, synchronization, and other control information was necessary for an optical recording system to record and play back data, and that one could manipulate the position of a track on a disc in order to encode such information. Respondents cite U.S. Patent No. 4,363,116 to Kleuters et al. (RX-65), as disclosing modulation of the depth of a track with a synchronizing clock and modulating the radial position of the track undulations with a signal that is used for controlling the position of a scanning spot relative to the track. Respondents argue that likewise U.S. Patent No. 4,223,187 to Yonezawa (RX-73, U.S. Patent No. 4,392,219 to Yokozawa (RX-71) and U.S. Patent No. 4,067,044 to Maeda et al. (RX-78) disclose modulating the radial position of track undulations with a signal that is used for controlling the position of a scanning spot relative to the track.[FN63] Thus, Respondents argue, it was well known by 1980 to modulate the depth or radial position of a track on an optical disc with synchronization and control information needed for recording or reproducing information.

Respondents argue that one of ordinary skill in 1980 would not read Bulthuis to be limited to the example provided in the article. The Bulthuis article contains the following statement: "The pregroove concept also allows storing synchronization information on the disk." RX-63 at 27. It is argued that one of ordinary skill would read this statement in light of what was known in the art about modulating the depth and radial position of a track to represent synchronization and control information.

Further, Respondents argue that while the Bulthuis article does not expressly disclose that the frequency of the clock signal modulated into the pregroove is chosen so as not to interfere with the content of data to be recorded on the disc, this is an inherent feature of any data recording system, as evidenced in the prior art by the Kleuters, Yokozawa and Yonezawa patents.

Philips argues that wobbling the pregroove in the '401 patent provided an elegant and novel solution to ensuring that a clock signal is always available to synchronize recording and reading of information on the disc. Philips argues that the prior art cited by Respondents (some of which was considered by the PTO during prosecution of the '401 patent) depends on clocking data written as pits or embossed data written directly into the data track at discrete locations on the disc, often in the form of a "header." It is argued that the prior art systems provided only intermittent clocks.

The Commission Investigative Staff argues that Respondents have not met their burden of establishing by clear and convincing evidence that there was any suggestion to combine the prior art relied upon, and that even if the various items of prior art were combined, they would not render the asserted claims of the '401 patent obvious.

The DOR system as described in the Bulthuis article puts its synchronization or clocking information into the track headers, in the form of pits or a pre-recorded relief pattern. *See, e.g.*, Hesselink Tr. 2562. A pregroove wobble is not used for those purposes, and the Bulthuis system has a straight pregroove that does not disclose a wobble of any sort.[FN64] Hesselink Tr. 2563-2565. Although the article states that the pregroove concept also allows for storing synchronization information on the disk, there is no evidence that one of ordinary skill in the art would have understood such a statement to mean that one could modulate the depth or radial position of the pregroove with synchronizing clock information.

Respondents turn to the prior art to argue that it was known in 1980 the one could manipulate the position of the track on the disc to encode clock information. Yet, it has not been established that one of ordinary skill would look to other prior art in the manner argued by Respondents or that the prior art disclosed the elements missing from the DOR system that would be required in order to render the '401 patent obvious.

The specification of the '401 patent specifically refers to the Kleuters patent, a central item relied upon by Respondents. The '401 specification refers to Kleuters (U.S. patent application Ser. No. 140,409) as containing information areas that alternate with synchronization areas. With respect to Kleuters, the '401 specification states that "the clock signal generation is intricate and sometimes not very reliable." Indeed, the clock signal in Kleuters cannot be continuous inasmuch as it is interspersed with other data. *See* CX-14/RX-60 ('401 Patent), col. 1, line 44 through col. 2, line 17; Hesselink Tr. 2559. Kleuters provides that when the distance between the headers containing clock data appears too great, clock information can be pre-recorded in additional "synchronization areas," of the pregroove or track, to correct the clock signal. RX-65, col. 9, lines 26-63, Figs. 6a, 6b; Hesselink Tr. 2560-2561. This approach provides clocking, with many reference positions for synchronizing the clock, possibly 128 different clock locations. Hesselink Tr. 2559-2560. However, there is a cost associated with the Kleuters invention, that of occupying additional track space and still not providing a continuous clock like that of the '401 patent, which is generated by scanning "any portion of the track."

The disclosure of the Kleuters patent represents the difficulty that the '401 patent tried to solve. Hesselink Tr. 2558. The '401 specification identifies the Kleuters system as complex, unreliable and wasteful use of disc space. CX-14, col. 1, line 66 through col. 2, lines 17. The '401 specification states that "it is the object of the invention to provide a record carrier ... which does not present the ... problems" of the Kleuters patent. CX-14, col. 1, lines 50 through col. 2, line 23; Hesselink Tr. 2557-2561.

Moreover, although Kleuters exhibits a wobbled track, it uses the wobble solely for radial tracking. *See* RX-65, col. 9, lines 26-63. Respondents contend that using a wobble for tracking makes it obvious to use a wobble for clocking. However, Kleuters demonstrates the opposite inasmuch as Kleuters addressed the same problem as in the '401 patent, i.e., the need for an improved clock, yet chose the conventional approach of writing clock data into the data track as pits albeit more closely and with more data. *See* Hesselink Tr. 2561. Kleuters both perceived the need for an improved clock and taught servo track undulation for other purposes. Yet, Kleuters did not choose to solve the clock problem with a pregroove wobble. This is strong evidence against Respondents' argument that one of ordinary skill with Kleuters (or similar art) and Bulthuis would have chosen to implement a clock by configuring a disc in the way claimed in the '401 patent.

The Yonezawa (RX-73) and Yokozawa (RX-71) patents similarly teach away from the '401 patent. They disclose a technique for writing a data track in a wobbled form, yet they use the wobble only for radial tracking during read out. Neither discloses a pregroove or a wobbled pregroove. *See* RX-73, col. 5, lines 47-68, col. 7, lines 35-40; RX-71, col. 3, lines 28-41.

Respondents ignore the fact that the prior art that discloses wobbles invariably use them for tracking rather than for clocking. For clocking, the prior art uses only pits and headers. The prior art taught away from the '401 patent. *See* Hesselink Tr. 2599, 2561, 2565. Respondents fail to offer even an explanation, much less a showing, that "there is a reason, suggestion, or motivation in the prior art that would lead one of ordinary skill in the art to combine the references, and that would also suggest a reasonable likelihood of success." *Smiths Indus. Med. Sys., Inc.* v. *Vital Signs, Inc.*, 183 F.3d 1347, 1356 (Fed. Cir. 1999). The prior art cited by Respondents cannot render the asserted claims of the '401 patent obvious.

Some of these same considerations were taken into account during the prosecution of the '401 patent. As explained above, the '401 patent explicitly identified the teachings of the prior art and the problem that the '401 patent application solved. Further, the Examiner originally rejected the claims of the '401 patent over Kleuters and Yokozawa, finding that "[i]t would have been obvious to one of ordinary skill in the art to further modify Kleuters ... and utilize a wobbling optical information track, i.e. with 'periodic undulations,"' given the "obvious benefit" of such a combination for "more precise tracking in the optical system as is taught by Yokozawa ...." CX-38 ('401 Prosecution History), Paper No. 5 at 4.

In response to the Examiner's rejection, Philips amended the claims "to clearly specify that during recording and/or reproducing of information on any portion of a track the clock signal is produced from the same portion of the track [that] such information is being recorded and/or reproduced," and distinguished the claimed invention over Kleuters on the same grounds, while pointing out that Yokozawa used the wobble only for tracking, not clocking. CX-38, Paper No. 6 at 3-4. The '401 patent subsequently issued over Kleuters and Yokozawa. *See* CX-38, Paper No. 10.

In addition to overarching failure of the prior art to disclose or suggest wobbling the pregroove for a continuous clock signal, there is a lack of evidence with respect to Respondents' argument that one of ordinary skill in view of the Bulthuis article would have chosen a clock signal frequency "so as not to interfere with the content of data to be recorded on the disc." *See* Respondents' Post-Hearing Patent Brief at 29. Respondents rely on general statements, and to a certain extent speculation, made by their technical expert during the hearing. The testimony fails to identify particular art or specific knowledge relevant to the field of optics in which one of ordinary skill would have been working during the critical time frame. Conclusory expert opinion alone does not meet the burden placed on a party challenging a patent claim. *See In re Sang-Su Lee*, 277 F.3d 1338, 1343 (Fed. Cir. 2002); *Ecolochem, Inc.* v. *Southern California Edison Co.*, 227 F.3d 1361, 1375 (Fed. Cir. 2000).

The inferences and hindsight offered by Respondents, when combined with the disclosures of the prior art that teach away from the '401 invention, do not demonstrate by clear and convincing evidence that the asserted claims are invalid due to obviousness.

Best Mode

Respondents argue that the asserted claims of the '401 patent are invalid due to the specification's alleged failure to disclose the best mode.

Section 112 of the Patent Act provides in pertinent part:

> *The specification* shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most clearly connected, to make and use the same, and *shall set forth the best mode contemplated by the inventor of carrying out his invention.*"

35 U.S.C. § 112, ¶ 1 (emphasis added).

The Court of Appeals for the Federal Circuit has held that "[t]he purpose of the best mode requirement is to ensure that the public, in exchange for the rights given the inventor under the patent laws, obtains from the inventor a full disclosure of the preferred embodiment of the invention." *Dana Corp. v. IPC Ltd. Partnership*, 860 F.2d 415, 418 (Fed. Cir. 1988), *cert. denied*, 490 U.S. 1067 (1989).

The Federal Circuit has explained the application of best mode requirement, as follows:

> In short, a proper best mode analysis has two components. The first is whether, at the time the inventor filed his patent application, he knew of a mode of practicing his claimed invention that he considered to be better than any other. This part of the inquiry is wholly subjective, and resolves whether the inventor must disclose any facts in addition to those sufficient for enablement. If the inventor in fact contemplated such a preferred mode, the second part of the analysis compares what he knew with what he disclosed -- is the disclosure adequate to enable one skilled in the art to practice the best mode or, in other words, has the inventor "concealed" his preferred mode from the "public?" Assessing the *adequacy* of the disclosure, as opposed to its *necessity*, is largely an objective inquiry that depends upon the scope of the claimed invention and the level of skill in the art.

Chemcast Corp. v. Arco Indus. Corp., 913 F.2d 923, 927-28 (Fed. Cir. 1990) (emphasis in original).

The extent of information that an inventor must disclose depends on the scope of the claimed invention. *Engel Indus. v. Lockformer Co.*, 946 F.2d 1528, 1531 (Fed. Cir.1991); *see Chemcast*, 913 F.2d at 927, 16 U.S.P.Q.2d at 1037 (an "objective limitation on the extent of the disclosure required to comply with the best mode requirement is, of course, the scope of the claimed invention"); *Randomex, Inc. v. Scopus Corp.*, 849 F.2d 585, 588, 7 U.S.P.Q.2d 1050, 1053 (Fed. Cir.1988) ("It is concealment of the best mode of practicing the claimed invention that section 112 ¶ 1 is designed to prohibit"). Accordingly, an inventor need not disclose a mode for obtaining unclaimed subject matter unless the subject matter is novel and essential for carrying out the best mode of the invention. *Applied Med. Resources Corp. v. United States Surgical Corp.*, 147 F.3d 1374, 1377, 47 U.S.P.Q.2d 1289, 1291 (Fed. Cir.1998). When a best mode relates directly to a claimed invention, it must be disclosed. *See Northern Telecom Ltd. v. Samsung Electronics*, 215 F.3d 1281 at 1289 (Fed. Cir. 2000). As summarized by the Federal Circuit: "In short, we have held that the best mode of making or using the invention need be disclosed if it materially affects the properties of the claimed invention itself." *Bayer AG v. Schein Pharmaceuticals, Inc.*, 301 F.3d 1306, 1319-20 (Fed. Cir. 2002). The Federal Circuit further held that "because the existence of a best mode of carrying out the invention is by definition known only to the inventor, *section 112* demands actual disclosure regardless of whether, as an abstract matter, practicing that mode would be within the knowledge of one of ordinary skill in the art." *Bayer*, 301 F.3d at 1314.

Respondents argue that the "predetermined frequency" disclosed in the '401 patent specification is 0.2f0, f0 or 2f0, where f0 is equal to 500 kHz.[FN65] Yet, Respondents argue, Marino Carasso, an inventor listed on the '401 patent, testified during his deposition that during his experimentation at the time that the '401 patent application was filed, he was successful in making the system work by placing the clock frequency in the range of 1.1f0 - 1.3f0 when using quadphase modulation (which is the modulation technique labeled "c" in Figure 4 of the '401 patent), and that 1.1f0 - 1.3f0 was the best range he knew at that time for the clock frequency. Respondents' Post-Hearing Patent Brief at 30.

Respondents argue that despite the testimony of Philips' technical expert at the hearing aimed at deriving the best frequency range from the '401 specification, and despite the Commission Investigative Staff's argument about the content of the Carasso testimony, the fact is that Mr. Carasso did testify that 1.1f0 - 1.3 f0 was the best range known to him at the time, and further, that neither this preferred frequency range nor any frequency within the range is disclosed explicitly or implicitly for any modulation technique in the '401 patent. *Id.* at 30-31; Respondents' Post-Hearing Patent Reply Brief at 18-19 (citing, *inter alia*, RPFF 1446 and 1446.1).

Philips argues that the very testimony relied upon by Respondents to support their best mode argument demonstrates that Mr. Carasso denied that the 1.1 - 1.3 f0 was the "best range." It is further argued that while Mr. Carasso's testimony may indicate that 1.1 - 1.3 f0 was thought to be best for the DOR system, that would not make it the best mode for practicing the claimed invention, which is not the same as the DOR system. Philips' Post-Hearing Patent Brief at 5-9.

The Commission Investigative Staff argues that Respondents have not presented clear and convincing evidence of failure to disclose the best mode in the '401 patent. The Staff argues, among other things, that Mr. Carasso did not testify that 1.1 - 1.3 f0 was the best mode known to him of practicing the claimed invention at the time the application was filed. OUII Post-Hearing Brief at 39-40.

The portions of the Carasso deposition relied upon by Respondents, when read in context, show that the range of "1.1 fo until 1.3 maybe" to which the witness referred during deposition pertained to the wobble track in a particular DOR system, and it is not clear that the system was the preferred embodiment for the claimed invention. Furthermore, the preference "[a]t that moment" that the experimenters at Philips had for quadphase modulation (as depicted in "modulation scheme c" of '401 patent Figure 4) was based on the particular work performed at a particular time, the precise date of which is somewhat unclear. There is no evidence that the inventors believed that the positive outcome of particular experiments constituted the best way of implementing the invention claimed in the '401 patent.[FN66] *See* Carasso Dep. (JX-1C) Tr. 145-147, 157-159.

For Respondents to prevail, as a threshold matter one would have to determine that the invention of the asserted patent claims is the same as the work referred to in the selected portion of the Carasso deposition, and that the inventors appreciated that fact. Yet, there is an insufficient basis upon which to make such a determination. Rather, it appears that Mr. Carasso objected to any attempt by Respondents' counsel to equate the particular work discussed in that portion of his testimony with the '401 patent's invention as whole, or the "best way" of implementing the invention. In the portion of the deposition testimony relied upon by Respondents, Mr. Carasso testified in part:

> Q. 1.1 fo to what?
> A. 1.1 fo to 1.3 in those experiments at that time.
> Q. You thought that was at that time when you did those experiments the best way - the best range to place it?
> MS PFEIFFER: Objection to form.
> A. No, but we said - we said that that was a range where we were successful in making the system with the electronics and with the know-how and especially electronics and know-how and phase locked loops at that moment.

Carasso Dep. (JX-1C) Tr. 146-147.

Overall, little evidence has been adduced on the question of best mode, and the evidence that has been relied upon by Respondents is either unclear or contrary to Respondents' arguments. Respondents have failed to prove by clear and convincing evidence that the asserted claims of the '401 patent are invalid for failure to disclose the best mode in the patent specification.

V. THE '856 PATENT

A. Claim Construction

United States Patent No. 5,023,856, entitled "Optically Readable Record Carrier for Recording Information, Apparatus for Manufacturing Such a Record Carrier, Apparatus for Recording Information on Such a Record Carrier, and Apparatus for Reading Information Recorded on Such a Record Carrier" issued on June 11, 1991, to Wilhelmus P.M. Raaymakers and Franciscus L.J.M. Kuijpers of the Netherlands.[FN67] CX-15/RX-61 ('856 Patent).

Philips asserts independent claim 1, and dependent claims 3 and 4 of the '856 patent, which are, as follows:

> **1**. An optical disc record carrier having a radiation-sensitive surface for recording information in a pattern of spiral or concentric tracks thereon, which information may be recorded or read by scanning such tracks with a radiation beam which produces radiation therefrom; characterized in that each of said tracks has a periodic modulation of its position in a direction transverse thereto and which, without occupying any portion of the track, generates a periodic clock signal in the radiation therefrom having a substantially constant frequency corresponding to the velocity of scanning

of said tracks, the frequency of said clock signal only varying in accordance with variations in said scanning velocity; and in that the frequency of said clock signal is modulated in accordance with a digital position signal which identifies the relative positions of said tracks on said record carrier; whereby said scanning velocity and the relative positions of said tracks are both recorded without occupying any portion of said tracks.

* * *

3. A record carrier as claimed in either of claims **1** and **2**,[FN68] wherein the digital position signal which is generated at any position in said track pattern indicates the time from the beginning of said track pattern to such track position when scanning is effected at a velocity corresponding to the frequency of said clock signal.

4. A record carrier as claimed in either of claims **1** and **2**, wherein said track modulation is in the form of a periodic wobble in the radial displacement of each of said tracks, the frequency of such wobble being modulated by said digital position signal.

CX-15/RX-61 ('856 Patent), col. 6, line 60 through col. 7, line 10, and col. 7, lines 17-27.

The '856 patent builds on the foundation of the '401 patent to provide reliable address or position information used to determine the location of the laser on the disc. The invention claimed in the '856 patent involves a further modulation of the wobbled pre-groove with a digital "position" signal identifying every location along the pre-groove. *See* CX-15/RX-61 ('856 Patent), col. 1, lines 57-61; Hesselink Tr. 568-573. This further modulation, which is disclosed in the specification as employing the technique of frequency modulation, provides position information throughout the disc while leaving open all of the area intended for recording user data. CX-15/RX-61 ('856 Patent), col. 2, lines 40-43, col. 5, lines 25-38, 62-64; Hesselink Tr. 568-578. This approach is particularly valuable where the EFM data encoding scheme is used. Claim 3, which depends from claim 1, claims a record carrier that indicates the position signal "which is generated at any position" of the pre-groove, often referred to as "ATIP" (for "absolute time in pre-groove") because it is expressed in terms of the time required to scan from the beginning of the track to that position, when the track is scanned at the velocity which produces the periodic clock signal. Claim 4, also depends from claim 1, and further specifies that the modulation that is frequency modulated is in the form of a "periodic wobble." *See* Hesselink Tr. 568, 576-577, 585-586.

The claim construction issues raised in connection with the asserted claims of the '856 patent, as in the case of the '401 patent, are the correct interpretation of the term "periodic," and whether the claims require a record carrier to be in an operating recording device. *See* Respondents' Post-Hearing Patent Reply Brief at 31-32; Respondents' Post-Hearing Patent Reply Brief at 5-8, 11; Philips' Post-Hearing Patent Brief at 30-32; OUII Post-Hearing Patent Brief at 5-7.

As previously discussed in connection with the '401 patent, Respondents and the other parties agree that the term "periodic" should be construed consistently for the '401, '856, '825 and '764 patents, and a consistent interpretation is supported by the claims, specifications and prosecutions histories of those patents. Respondents' proposal to limit the claim term "periodic" to identical repetition (subject to a 100 Hz tolerance) was not found to be supported by any of the evidence of record, including the evidence intrinsic to the patents.

Respondents' argument that the asserted claims of the '856 patent require a carrier operating in a recording device are similar to those advanced in connection with the '401 patent, to the effect that a recording or reproduction device is necessary in order to generate a clock signal suitable for use in recording or reproducing information. However, in a manner similar to that of the '401 patent, the asserted claims of the '856 patent are directed to "[a]n optical disc record carrier," and not to an apparatus or a method. The asserted claims read on a record carrier that is configured in the specified manner, and indeed the evidence shows that it is well known in the art that the signal derived from a record carrier will result from the physical configuration of the disc features, such as "periodic modulation" or "periodic wobble." *See* Hesselink Tr. 549-550, 560-561, 583. There is no requirement in the asserted claims of the '856 patent that the record carrier be placed in a recording device.

B. Infringement Determination

Philips argues that Respondents' non-infringement arguments are based on their discredited player and periodic claim inter-

pretation arguments, while the tests of Respondents' products show that the discs contain every limitation of claims 1, 3 and 4 of the '856 patent. Philips argues that Respondents' own documents, corporate designee testimony and other admissions indicate that their discs are Orange Book compliant, and that is further evidence that the accused discs have a wobble that contains both a clock and ATIP information. Philips' Post-Hearing Brief at 32.

Respondents argue that the accused discs do not infringe the asserted claims of the '856 patent because they do not have tracks that exhibit "periodic modulation," in accordance with their proposed claim construction, and because the claims require a record carrier operating in a recording or reproduction device. Respondents' Post-Hearing Patent Brief at 32-34; Respondents' Post-Hearing Patent Brief at 12.

The Commission Investigative Staff argues that under the proper claim construction, the accused products have tracks with periodic modulation as required by the asserted claims of the '856 patent, noting that the +/- 1 kHz bandwidth found in the accused discs is within the frequency modulation of +/- 1.5 kHz suggested in the '856 specification. The Staff also argues that no recorder or player is needed for infringement of the asserted claims, inasmuch as they require a disc with track undulation containing a frequency such that, when scanned with a spot of radiation, the undulation will generate a periodic track signal. *See* OUII Post-Hearing Reply Brief at 20-21.

There is no dispute concerning the characteristics of Respondents' discs. Respondents' technical defense to Philips' infringement allegations is based on claim construction arguments which are unsound.

It has been demonstrated by at least a preponderance of the evidence that Respondents' accused products directly infringe the asserted claims of the '856 patent.

C. Validity

Respondents allege that the asserted claims of the '856 patent are invalid because (1) they are obvious in view of the prior art, and (2) the best mode of practicing the invention is not disclosed in the '856 patent specification. *See* Respondents' Post-Hearing Patent Brief at 34-36; Respondents' Post-Hearing Patent Reply Brief at 17-20. Respondents' arguments are opposed by Philips and by the Commission Investigative Staff. *See* Philips' Post-Hearing Patent Brief at 32-25; Philips' Post-Hearing Patent Reply Brief at 9; OUII Post-Hearing Patent Brief at 33-35, 41; OUII Post-Hearing Patent Reply Brief at 8-11.

Obviousness[FN69]

Respondents argue that although the '401 patent discloses many features claimed in the '856 patent, it does not disclose modulating the frequency of the track undulations in accordance with a digital track position signal. Nevertheless, Respondents argue, the asserted claims of the '856 patent would have been obvious to one of ordinary skill in the art because at the time that the '856 patent application was filed in 1986, it was known that addressable track locations were necessary for recording information on optical discs (for example, in the Bulthuis article), and it was "known to modulate the position of a track with track address information." For the latter element, Respondents rely on U.S. Patent No. 4,716,560 to Itonaga (originally filed in Japan in 1984)(RX-74).

Respondents argue that the Itonaga patent discloses a recordable optical disc with concentric recording tracks, the widths of which are modulated with digital track address signals. It is argued that by 1986, it would have been obvious to modulate the frequency of the track address undulations taught by the '401 patent with digital track addresses taught by Itonaga, especially in light of the fact that for decades frequency modulation was known to a person skilled in the art. It is further argued that the time from the beginning of a track to a current track position can be determined from the sector number modulated into the track width, and the clock frequency obtained from the track modulation. Respondents thus argue that if the Itonaga reference is combined with the teachings of the '401 patent, the digital tack address signal modulated into the frequency of the track undulations will represent the time from the beginning of a track to the location on the track where a particular track address signal is located.

Philips argues that as recognized in the '856 patent specification, a key feature of the asserted claims of the '856 patent is modulation of the pregroove to provide both (1) a clock for controlling the velocity of disc rotation and (2) a position signal that identifies the relative positions on the disc, and also doing so in such a manner that the critical information does not occupy any portion of the track, and the track is left entirely available and uninterrupted for recording user data. It is argued that no prior art, or combination of art, provided the solution offered by the '856 patent. Philips argues that inasmuch as the Itonaga patent and the '401 patent (specifically mentioned in the '856 patent)[FN70] were considered during prosecution of the '856 patent, Respondents bear an especially heavy burden in their attempt to show obviousness.

Philips argues that width modulation is an undeveloped concept in Itonaga. It is argued that Itonaga does not use frequency modulation, and further that the technique used by Itonaga is incompatible with the '401 patent. Philips argues that the '401 patent teaches storing position information in a header written into the data track, while Itonaga shows a method for directly altering the width of the track to indicate address and to provide a tracking control signal. Philips argues that Itonaga makes no mention of a clock function or the frequency modulation of a clock to provide address information. According to Philips, a person of ordinary skill in the art would have had no motivation to combine the '401 patent and Itonaga, and such a combination would not produce the claimed invention.

The Commission Investigative Staff argues that the track in Itonaga does not encode "0"s and "1"s to represent position information, and does not encode position information in the track shape itself, as is done in the '856 patent. The Staff likens Itonaga's width modulation to "bookmarks" or synchronization signals in that a change in width denotes the beginning or ending of a position information signal within the data track. Moreover, it is argued, Itonaga is not a frequency modulated system, and would not work with the '401 patent because the width modulation of Itonaga could not be superimposed on the track undulations of the '401 patent. The Staff further argues that there would have been no motivation to combine the Itonaga patent and the '401 patent, and even assuming that one would have combined them, they would not have rendered obvious the asserted claims of the '856 patent.

The '401 patent teaches the storing of position information in a header written into the data track, separate from the clock signal. Thus, the '401 patent did not disclose all the elements of the asserted claims of the '856 patent. The Itonaga patent, to which Respondents look for the additional disclosures, teaches directly altering the width of the track to indicate address and to provide a tracking control signal without any mention of a clock function or the use of frequency modulation. *See, e.g.*, RX-74 (Itonaga Patent), col. 1, lines 33-43. While it is undisputed that frequency modulation, in general, was known for decades before the '856 patent's priority date, there remains a serious question as to how one of ordinary skill in the art would have been motivated to combine the '401 patent with the Itonaga patent, and whether one could have refined or supplemented the combination so as to obtain the wobble disclosed in the '856 patent.

The evidence presented at the hearing shows that simply attempting to combine the Itonaga patent and the '401 patent would present a number of problems, and would fail to satisfy all elements of the asserted '856 patent claims. While Itonaga purports to show width modulation to encode address information into the shape of the track, the patent does not disclose how to do it. Calculations made by Philips' technical expert show that Itonaga does not use frequency modulation. *See* Hesselink Tr. 2574-2575; Mansuripur Tr. 1337-1338. Nevertheless, if address information were encoded using width modulation rather than frequency modulation, the width would vary so as to cause severe consequences for the system. If width modulation could somehow be combined with the '401 patent's wobble, there would likely be a signal that would be unsuitable for velocity control. Hesselink Tr. 2575-2577. There is no evidence that the knowledge of frequency modulation available to one of ordinary skill in the art would have motivated and further enabled one to combine some of Itonaga's teachings with the '401 patent, and thus to obtain the claimed invention of the '856 patent.

This case is an example of why the law recognizes that one cannot selectively cull components from the prior art through hindsight to fit the parameters of a patented invention. There must be a teaching or suggestion within the prior art, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources of information, to select particular elements, and to combine them in the way they were combined by the inventor. *ATD Corp. v. Lydall, Inc.* 159 F.3d 534, 546 (Fed. Cir. 1998). In this case, even if the components were selected from the prior art, it is unclear how one of ordinary skill could have assembled them in order to make them work.[FN71]

Respondents have not demonstrated by clear and convincing evidence that the asserted claims of the '856 patent are invalid due to obviousness.

Best Mode[FN72]

Respondents' best mode argument is based on independent claim 1, which requires a clock signal frequency "modulated in accordance with a digital position signal which identifies the relative positions of said tracks on said record carrier," and the deposition testimony of one of the inventors listed on the '856 patent, Wilhelmus Raaymakers.[FN73] Respondents argue that Mr. Raaymakers testified that the invention claimed in the '856 patent and the invention claimed in the '825 patent arose from the same work in 1986, before the October 6, 1986 filing of the '856 patent's foreign priority application in the Netherlands. It is argued that Mr. Raaymakers testified that in order to implement the '856 patent's claimed feature of digital position signals which identify the relative position of said tracks on said record carrier, it is necessary to use ATIP synchronization signals so that track portions can be readily located.[FN74] According to Respondents, Mr. Raaymakers testified that the use of ATIP synchronization signals was the best way he knew of for recovering the track position on a disc. Respondents argue that inasmuch as ATIP synchronization signals are not disclosed in the '856 patent, the asserted independent and dependent claims of the '856 patent are invalid for failure to disclose the best mode of practicing the claimed invention.

Philips argues that the deposition testimony relied upon by Respondents was not properly designated by them, and in any event bears only a scant resemblance to what the deponent actually said. Philips argues that the best mode questions relied upon by Respondents pertain to testimony about the '825 patent, not the '856 patent, and the use of ATIP synchronization codes is in fact a major difference between the two patents. Philips also disputes that Mr. Raaymakers testified that at the time in question he thought that the use ATIP synchronization signals was the best way to recover track position on a disc.

The Commission Investigative Staff argues that it is unclear from the deposition testimony of Mr. Raaymakers whether the development of the special ATIP synchronization signals described in the '825 patent occurred prior to the time that the '856 patent application was filed. The Staff also notes that some ATIP information is contained in the '856 patent, and that while it is not the same as the detailed system claimed by the '825 patent, it might be sufficient for one of ordinary skill to realize that synchronization codes should be employed in practicing the '856 patent.[FN75]

As framed by the parties' briefs, the threshold question is whether the evidence demonstrates that the '856 patent inventors knew of the use of ATIP synchronization signals, similar to those disclosed in the '825 patent, before the Netherlands foreign priority application was made on October 6, 1986. Respondents' arguments are based only on the deposition testimony of Mr. Raaymakers.

There are certain difficulties presented by the fact that the testimony at issue is presented only in the form of a deposition transcript. For example, many technical points must remain somewhat obscure because the Administrative Law Judge is not able to request clarification or elucidation from Mr. Raaymakers or form the parties' technical experts. Nevertheless, it does appear that, as argued by Respondents, Mr. Raaymakers testified that he had at least two significant breakthroughs within approximately one week. One pertained to encoding information into the wobbled track, and the other pertained to synchronization signals. Further, it appears that he thought that the particular type of synchronization signals he chose to use in the ATIP system were the best way to provide a synchronization signal for recovering a position information signal, and that in the weeks following his discoveries, he was able to confirm that fact. *See* Raaijmakers Dep. (JX-1C) Tr. 34-37, 80-82.

A question is raised as to when the initial discoveries and the subsequent testing occurred. When Respondents' counsel attempted to find out when these discoveries occurred, and when the work on this project took place, the witness could confirm only that it must have been in 1986. Mr. Raaymakers testified that he could not remember the month or the season in which these events commenced and developed. He did testify that there would have been written records. *See* Raaijmakers Dep. (JX-1C) Tr. at 45-48. Respondents' arguments are not based on such records.

Furthermore, a close examination of the deposition testimony at issue shows, as Philips points out, that the '856 patent was not

specifically raised with Mr. Raaymakers during this line of questioning. Rather, the questioning took place in general terms, or when a patent was raised with Mr. Raaymakers during the pertinent portion of his deposition, it was the '825 patent, not the '856 patent. *See* Raaijmakers Dep. (JX-1C) Tr. 62, 74. Inasmuch as the '825 patent is in many ways a refinement of the '856 patent, it seems logical that one could deduce some facts about the '856 patent from testimony in which the '825 patent was mentioned. Yet, as pointed out by the Staff, Mr. Raaymakers never testified that the ATIP synchronization signals described in the '825 patent were known to him at the time that his application for the '856 patent was filed, and the '856 patent relies on a simpler synchronization scheme. *See* OUII Post-Hearing Reply Brief at 13-15. One cannot know how Mr. Raaymakers would have testified if he had been examined directly about the best mode of the '856 patent during his deposition, or if he had testified about the '856 patent at the hearing.

As Philips admits, the timeline that emerges from Mr. Raaymakers' deposition testimony does not eliminate the possibility that he learned of the importance of synchronization signals before October 6, 1986. Nevertheless, the testimony is at best equivocal on this point, especially when one takes into account the fact that Mr. Raaymakers did not testify that the inventors had full knowledge of the '856 and '825 patent inventions at the same time. *See* Philips' Post-Hearing Patent Reply Brief at 14; Raaijmakers Dep. (JX-1C) Tr. 115-116.

The evidence of record does not demonstrate clearly and convincingly that the asserted claims of the '856 patent are invalid due to a failure of the specification to set forth the best mode.

VI. THE '825 PATENT

A. Claim Construction

United States Patent No. 4,999,825, entitled "Recording/Reading Apparatus for Inscribable Record Carrier and Its Manufacture," issued on March 12, 1991 to Wilhelmus Raaymakers Franciscus L.J.M. Kuijpers of the Netherlands.[FN76] CX-17 ('825 Patent).

Philips asserts claims 1, 2,4, 5 and 6 of the '825 patent, which are, as follows:

> **1**. An optically readable and inscribable record carrier comprising: a recording layer for recording an information pattern of optically detectable recording marks, the record carrier having a servo track wherein a portion for information recording includes a periodic track modulation different from the information pattern, the periodic track modulation having a modulation frequency indicative of a position-information signal comprising position-code signals alternating with position-synchronization signals.
>
> **2**. An optically readable inscribable record carrier as claimed in claim **1**, characterized in that the position-code signals are biphase-mark-modulated signals and the position-synchronization signals have signal waveforms different from the biphase-mark-modulated signal.
>
> * * *
>
> **4**. A record carrier as in either claim **1** or claim **2**, characterized in that the periodic tack modulation has a period between 54 x 10^{-6} meters, and 64 x 10^{-6} meters and a distance between starting positions of the track portions includes the position-synchronization signal corresponding to 294 times an average of the period of the track modulation.
>
> **5**. A record carrier as claimed in any of the claims **1** or **2**, characterized in that the position-code signal is indicative of elapsed time at a nominal scanning velocity to cover a distance between a beginning of the track and a position where the track provides track modulation corresponding to the position where the track provides track modulation corresponding to the position-code signal.
>
> **6**. A record carrier as claimed in claim **5**, characterized in that the position-code signal is modulated in conformity with a position-information code which comprises at least a portion similar to an absolute-time code contained in an EFM-modulated signal in conformity with the CD-standard.

CX-17 ('825 Patent), col. 18, lines 42-57; col. 18, line 64 through col. 19, line 16.

The '825 patent addresses some of the same problems as the '856 patent, and lists the same inventors. The '825 patent provides a better means for synchronizing signals during the recording process. Hesselink Tr. 587-588. An improvement described in the '825 patent relates to correction of the phase difference between the EFM position code signals and absolute time codes that may result from flaws, such as scratches on the carrier surface during recording.[FN77] *See* CX-17 ('825 Patent), col. 10, lines 1-5. The record carrier of claim 1 is configured for a system in which scanning velocity is corrected depending upon the phase difference between the two signals. *See* CX-17 ('825 Patent), col. 10, lines 6-11; Hesselink Tr. 587, 590; Mansuripur Tr. 1195. Claim 2, which depends from claim 1, specifies that the position-code signals are "biphase mark modulated signals," which represent a particular digital data encoding scheme. These position-code signals contrast with the position-synchronization signals, which violate the rules of biphase-mark encoding.[FN78] Hesselink Tr. 593-594. While there are many areas of agreement among the parties as to the claimed invention of the '825 patent, three issues have been raised with respect to proper construction.

First, Respondents argue that the claim term "period," as in "period track modulation" must conform to the proposed interpretation offered for the other asserted patents that use the term. *See* Respondents' Post-Hearing Patent Brief at 37; Respondents' Post-Hearing Reply Brief at 5. That issue has already been analyzed, in detail in connection with the '401 patent, and Respondents' proposed interpretation has been rejected.

Second, Respondents argue that Philips improperly reads analog frequency modulation to the asserted claims of the '825 patent, and thus does not allow for the frequency key shift method specifically mentioned in the specification.[FN79] By "analog," Respondents appear to be referring to the modulation of a carrier frequency. *See* Respondents' Post-Hearing Patent Brief at 37-38. A review of the parties' brief shows that while Philips does argue that the '825 patent relies on analog frequency modulation, it does not deny that continuous phase frequency shift keying or "CPFSK" is a form of frequency modulation.[FN80] The issue is whether other (non-CPFSK) prior art that does not use a carrier frequency discloses frequency modulation, and alone or in combination with other art renders invalid the asserted claims of the '825 patent. *See, e.g.*, Respondents' Post-Hearing Patent Brief at 19. The specific art in question is discussed in detail below with respect to the validity issue. In any event, it is clear from the plain language of independent claim 1 that the claimed invention has a periodic track modulation with a *modulation frequency* indicative of a position-information signal, and that no part of that limitation can be avoided. *See* CX-17 ('825 Patent), col. 18, lines 42-51.

Third and finally, Respondents argue that the asserted claims of the '825 patent require a record carrier operating in a recording device. It is argued that the position-code signals specify information that is only meaningful and accurate when the record carrier spins at a certain velocity in a recording or reproduction device. *See* Respondents' Post-Hearing Patent Brief at 39. Philips and the Commission Investigative Staff oppose Respondents' proposed interpretations. *See* Philips' Post-Hearing Brief at 35-36; OUII Post-Hearing Brief at 22.

As in the case of many other claims previously discussed in this Initial Determination, the asserted claims of the '825 patent plainly recite a "record carrier," and not the device in which a record carrier is placed for recording or reading, or the placing of the record carrier in such a device. The claims cover a record carrier that is configured in such a way (for example, to be made with a particular periodic track modulation) so as to exhibit certain characteristics if and when it is used. *See* Hesselink Tr. 2596-2597. The claims of the '825 patent do not, however, require that the record carrier be placed in an operating recorder or player.

B. Infringement Determination

Philips argues that Respondents' accused discs directly infringe the asserted claims of the '825 patent, as confirmed by tests performed by experts for Philips and Respondents. It is also argued that Respondents have admitted that their discs include position and synchronization signals in the wobble track,[FN81] and that their discs are Orange Book compliant, thus providing additional evidence of infringement. Philips' Post-Hearing Patent Reply Brief at 36.

Respondents argue that their discs do not infringe the asserted claims of the '825 patent, under their proposed claim interpretation. Respondents' arguments concerning the characteristics of frequency modulation and the existence of frequency modulation in the prior art do not relate to the question of whether Respondents actually practice the asserted claims of the '825

patent. Rather, Respondents argue that the accused discs do not exhibit "periodic modulation" required by the claims because of the deliberate modulation of the radial track position with varying address and control information, and with deviation from perfect periodicity larger than +/- 50 Hz. Respondents also argue that the asserted claims of the '825 patent require a recording/reproduction device. Respondents' Post-Hearing Patent Brief at 39-40; Respondents' Post-Hearing Patent Reply Brief at 12.

The Commission Investigative Staff argues that Respondents' accused discs infringe the asserted claims of the '825 patent. It is argued that given the proper interpretation of the term "periodic," the accused products have tracks with the required periodic modulation, noting that the +/- 1 kHz bandwidth found in the accused products is expressly within the frequency modulation of +/- 1 kHz suggested in the specification of the '825 patent for EFM signals. The Staff further argues that with respect to the question of whether or not the asserted '825 patent claims require a device, Respondents do not give a fair reading to the '825 patent claims. With respect to claim 5, for example, it is argued that all that is required is a disc containing position codes such that if the disc is spun at a certain velocity, the position codes will correspond to elapsed time at that velocity. OUII Post-Hearing Patent Brief at 21-22 (citing, *inter alia*, Hesselink Tr. 2596).

As in the case of other patents discussed in this Initial Determination, there is no dispute concerning the configuration of the accused discs. Respondents' technical infringement defense is based on matters of claim construction. Respondents' proposed interpretations have been rejected. It has been established by at least a preponderance of the evidence that Respondents' accused products directly infringe the asserted claims of the '825 patent.

C. Validity

Respondents argue that the asserted claims of the '825 patent are invalid in view of (1) U.S. Patent No. 4,942,565 which issued to Roger Lagadec and was assigned to Sony Corporation of Japan (RX-177),[FN82] and (2) United States Patent No. 4,907,216 which issued to Johan M. Rijnsburger and was assigned to U.S. Philips Corp. (RX-66/RX-175). Respondents' Post Hearing Patent Brief at 40-43; Respondents' Post-Hearing Patent Reply Brief at 15-16.

Respondents argue that the Lagadec patent discloses all elements of asserted claims 1, 3, 4, 5 and 6 of the '825 patent, and therefore renders those claims invalid due to anticipation.[FN83]

With respect to asserted claim 2 of the '825 patent, Respondents argue that the Lagadec patent does not disclose that the time signal codes are "biphase-mark-modulated signals." Nevertheless, Respondents argue that it would have been obvious to modulate the time code signals shown by Lagadec using biphase-mark modulation, and to use a different modulation scheme to encode the preamble (synchronization) signals. It is argued that "[s]uch a scheme is shown in the Rijnsburger '216 patent." *See* Respondents' Post Hearing Patent Brief at 41; *see also* Respondents' Post-Hearing Patent Reply Brief at 15-16 (discussing anticipation, and omitting claim 2). Thus, it appears that Respondents argue that claim 2 is also invalid for obviousness.[FN84] Respondents argue that although the frequency of the Rijnsburger track may not be an example of frequency modulation, "it would have been obvious to a person skilled in the art in 1988 to use some form of frequency modulation in the system disclosed in the Rijnsburger patent." Respondents' Post-Hearing Patent Reply Brief at 42-43.

Both Philips and the Commission Investigative Staff dispute Respondents' arguments. Philips and the Staff argue that Respondents have not demonstrated that any asserted claim of the '825 patent is rendered anticipated or rendered obvious by any of the art cited by Respondents. *See* Philips' Post-Hearing Patent Brief at 36-40; Philips' Post-Hearing Patent Reply Brief at 19-24; OUII Post-Hearing Patent Brief at 24-26, 35; OUII Post-Hearing Patent Reply Brief at 15.

Frequency modulation (FM) is central to the claimed invention of the '825 patent because it allows continuous clocking, address and synchronization information to be encoded into the pregroove wobble, without interrupting user data in the pregroove or the loss of track space for storing user data on the disc. *See, e.g.*, Mons Tr. 375, 385-387, 394-410. Yet, the Lagadec and Rijnsburger patents relied upon by Respondents do not use frequency modulation. The prior art techniques used instead by Lagadec and Rijnsburger are susceptible to numerous problems that the '825 patent seeks to avoid, and indeed these prior art patents teach away from the solution disclosed and claimed in the '825 patent. *See* Hesselink Tr. 2580-2585.

Respondents attempt to overcome the fact that their cited prior art does not teach frequency modulation by arguing that the '825 patent does not require frequency modulation as that term is ordinarily understood. Respondents propose instead that any change in frequency in accordance with a position information signal will satisfy the requirement of claim 1, regardless of whether there is modulation of a carrier frequency. *See, e.g.*, Respondents' Post-Hearing Patent Reply Brief at 43; Mansuripur Tr. 1206; Mansuripur Decl. ¶¶ 11-12 ("Any changing of the frequency of the track position in accordance with a position-information signal will satisfy the claim language.").

If frequency modulation were not needed in the invention of the '825 patent, or if the nature of frequency modulation were defined in an overly broad manner, then obviously the prior art would be more likely to render the asserted '825 patent claims invalid. This is essentially how Respondents propose that the '825 patent be interpreted and how the prior art should be analyzed.

However, the Administrative Law Judge must reject Respondents' proposal. The relevant limitation in claim 1 of the '825 patent plainly requires a track "having a *modulation* frequency indicative of a position-information signal." CX-17 ('825 Patent), col. 18, lines 48-49 (emphasis added). Respondents' construction wrongly reads the word "modulation" out of the phrase "having a modulation frequency."[FN85] Yet, it is axiomatic that meaning must be given to every word in a claim. *See Bell Communications Research, Inc.,* 113 F. Supp. 2d at 653.

It is also axiomatic that the claims must be construed in light of the specification. *Vitronics*, 90 F.3d at 1582. The specification of the '852 patent clearly and repeatedly calls for frequency modulation. *See, e.g.*, CX-17 ('825 Patent), col. 4, lines 20-24, col. 5, lines 66-68, col. 14, line 25 though 18, lines 16; *see also* Hesselink Tr. 2579.

Lagadec does not employ analog frequency modulation or any means that can be described as frequency modulation in any conventional way.[FN86] Hesselink Tr. 2580-2584, 2599. The Lagadec patent's disclosure in fact exhibits several problems that the analog frequency modulation method disclosed in the '825 patent was designed to solve.[FN87] Hesselink Tr. 2583-2585. According to Respondents, the Lagadec patent discloses a wobbled pregroove whose shape is varied at frequencies indicative of alternating address signals and synchronization signals (or preambles), with the address and synchronization signals encoded as binary 0s and 1s. Respondents argue that the "track shape will vary in accordance with specific patterns of 0s and 1s being represented in the preamble and time codes." Respondents' Post-Hearing Patent Reply Brief at 15-16. Respondents argue that Lagadec discloses frequency modulation because Lagadec discloses frequency key shifting, "which is precisely contemplated by the '825 patent for modulating the track shape. *See, e.g., Id.* at 16.

However, continuous phase frequency shift keying uses a carrier signal, at least as it is referenced in the '825 patent. Hesselink Tr. 2567. In the case of the '825 patent, it would be the 22.05 kHz wobble signal. CPFSK produces an analog sinusoidal waveform having two instantaneous frequencies, one corresponding to the high value of the digital modulating signal ("1") and one corresponding to the low value of the digital modulating signal ("0"). By using biphase modulation, there is always an equal number of 1s and 0s in the code, so that the average value of the signal, i.e., the frequency, will always be equal to the carrier signal. Such a system is important for reliable velocity control. Hesselink Tr. 2566-2570, 2578-2579.[FN88] This is not the same as the pattern of digital 0s and 1s taught in the Lagadec patent, in which the average value of the frequency changes as the address changes. *See, e.g.*, Hesselink Tr. 2580, 2583 (For example, "if you get more 1s in your address code, you're going to get more low-frequency components in your average signal.").

Similarly, the Rijnsburger patent does not use frequency modulation or appear to be compatible with frequency modulation. Rijnsburger does not use the biphase-mark-modulated signals missing from Lagadec, which are needed to render obvious claim 2 of the '825 patent (assuming that Lagadec supplied the other elements). Hesselink Tr. 2583-2584. Instead, Rijnsburger uses three major frequencies for encoding position information on the disc. Hesselink Tr. 2582, 2599; RX-66. The '825 patent, like the '856 patent, uses an FM-modulated wobble with a precise, periodic 22.05 kHz average frequency. In contrast, the Rijnsburger patent is not well-suited for use with the wobble clock because in Rijnsburger, "[t]he average frequency changes," and "[l]ow-frequency information interferes with velocity control, and there is no room for error." Hesselink Tr. 2582; *see* CX-619C, '825 Slide 5; RX-66.

Even if the Rijnsburger signal is filtered to change the waveform, Rijnsburger would not look like, or have the same results as, a frequency modulated signal would have for "controlling the speed and finding its position." Still, there would be interference. Hesselink Tr. 2583. Furthermore, filtering out the low- and high- frequency components in Rijnsburger would risk filtering out the data the signal is supposed to be carrying. Hesselink Tr. 2583-2585 (ability to provide information without interference and other problems presented by Lagadec and Rijnsburger "is the beauty of frequency modulation."); *see* CX-619C, '825 Slide 7.

In addition to the deficiencies of the Lagadec and Rijnsburger patents when it comes to the elements of the '825 patent claims, Respondents' approach to combining references is legally improper and does not satisfy their burden of proof by clear and convincing evidence. Respondents' arguments concerning Lagadec and Rijnsburger are based on the type of impermissible analysis that is available only through hindsight, and is presented without a convincing explanation of the teaching or motivation required to combine the prior art references. *Ecolochem*, 227 F.3d at 1371-72. It does not suffice to offer an unsupported opinion that one of ordinary skill in the art would have known about the prior art, or even about frequency modulation in general. The fact that Lagadec and Rijnsburger existed does not explain how one of ordinary skill in the art would know how to combine them to modulate the time code signals shown by Lagadec using biphase-mark modulation, and to use a different modulation scheme to encode other signals. Rather, there must be a "convincing discussion of the specific sources of the motivation to combine the prior art references." *Id.* at 1373.

Respondents have not demonstrated by clear and convincing evidence that the asserted claims of the '825 patent are invalid due to anticipation or obviousness.

VII. THE '764 PATENT

A. Claim Construction

United States Patent No. 5,418,764, entitled "Recording Device, a Record Carrier Having Preformatted Address Codes and Auxiliary Codes Providing Control Data for Use by the Recording Device, and an Information Recording System Including Both the Recording Device and the Record Carrier," issued on May 23, 1995, to Rudolf Roth and Paulus C.M. van der Zande of the Netherlands.[FN89] CX-16/RX-567 ('764 Patent).

Philips asserts independent claim 20 and dependent claims 23-34 of the '764 patent, which are, as follows:

> **20**. A record carrier having a preformed recording track which is transversely modulated in accordance with an auxiliary signal, said auxiliary signal comprising:
>
> successive address codes specifying addresses of successive track portions at which said address codes are located; and
>
> auxiliary codes, arranged among said address codes, specifying control data for use by a recording device in recording an information signal on said track, said auxiliary codes having identifying indicia which distinguishes them from said address codes.
>
> * * *
>
> **23**. The record carrier as claimed in claim **22**[FN90], wherein said address codes include absolute time codes specifying said distances as playing time of said record carrier from said reference position.
>
> **24**. The record carrier as claimed in claim **20**, wherein said track is transversely modulated such that there is a periodic excursion of said track transverse to the track direction, said excursion having a frequency in conformity with said auxiliary signal.
>
> **25**. The record carrier as claimed in claim **20**, wherein said track portions are substantially concentric about a common center of rotation, and said address codes indicate the addresses of said track portions in relation to a reference position which is at a predetermined radial distance from said center of rotation.
>
> **26**. The record carrier as claimed in claim **25**, wherein said auxiliary codes specify a track portion at a radial distance from said reference position at which a table of contents should be recorded on said record carrier.

27. The record carrier as claimed in claim **26**, wherein the track portion at which the table of contents should be recorded is closer to said center of rotation than is said reference position.
28. The record carrier as claimed in claim **25**, wherein said auxiliary codes specify a track portion at a radial distance from said reference position at which a lead-out signal indicating the end of said information signal must commence in order to be completed before the end of said track.
29. The record carrier as claimed in claim **20**, wherein said auxiliary codes specify the location of the track portion at which a table of contents should be recorded on said record carrier.
30. The record carrier as claimed in claim **29**, wherein said auxiliary codes also specify the location of the track portion at which a lead-out signal indicating the end of said information signal must commence in order to be completed before the end of said track.
31. The record carrier as claimed in claim **20**, wherein said auxiliary codes specify the location of the track portion at which a lead-out signal indicating the end of said information signal must commence in order to be completed before the end of said track.
32. The record carrier as claimed in claim **20**, wherein said address codes and said auxiliary codes have the same data format.
33. The record carrier as claimed in claim **32**, wherein said auxiliary codes are distinguished from said address codes in that said auxiliary codes comprise bit combinations which do not occur in said address codes.
34. The record carrier as claimed in claim **20**, wherein said auxiliary codes are distinguished from said address codes in that said auxiliary codes comprise bit combinations which do not occur in said address codes.
CX-16/RX-57 ('764 Patent), col. 14, line 34 through col. 16, line 14.

The '764 patent describes a way of providing a recorder certain data that it needs to operate. This is done by frequency modulating the pre-groove wobble to provide an "auxiliary signal" that includes address codes and also "auxiliary codes which can be distinguished from the address codes" and which "comprise control data for controlling the recording process ....." CX-16/RX-57, col. 1, line 67 through col. 2, line 12. The auxiliary codes are distinguished from the address codes in the auxiliary signal, for example, by using certain unique bit combinations not used in the address codes. *See* Hesselink Tr. 617-618; CX-16/RX-57 ('764 Patent), col. 7, lines 7-10); *see also* CX-16/RX-57 ('764 Patent), col. 1, lines 23-34 (referring to the '856 patent's general disclosure of FM-modulating address information into the pre-groove wobble), col. 3, lines 40-44 (referring to the '825 patent as disclosing an example of an inscribable record carrier that may be used with the claimed invention). The control information provided via frequency modulation of the pre-groove wobble includes, for example, identifying the type of disc, the starting point of the program area or lead-in area of the disc, and the recommended laser power for writing on the particular disc. Hesselink Tr. 629;CX-16/RX-57 ('764 Patent), col. 5, line 61 though col. 7, line 62. This information is especially useful for recording in a format that is readable by standard CD players. CX-16/RX-57 ('764 Patent), col. 1, lines 41-64. The '764 patent describes the auxiliary codes as providing information needed to control specific aspects of the recording process and as having a specific format. *See* Hesselink Tr. 628-645; CX-16/RX-57 ('764 Patent), col. 2, lines 7-12, col. 6, line 64 through col. 7, line 1, Fig. 2, Fig. 6, Fig. 7.

There are three areas of dispute concerning construction of the asserted claims, with Respondents' proposed interpretations opposed by both Philips and the Commission Investigative Staff.

The Claim Term "Periodic"
Respondents argue that the term "period" as used in claim 24 of the '764 patent is properly construed to be consistent with its proposed interpretation for the '401, '856 and '825 patents., i.e., "repeating itself identically at regular intervals, subject to acceptable tolerances from perfect periodicity due to noise or manufacturing imperfections." Respondents rely on the arguments set forth in connection with the other patents. *See* Respondents' Post-Hearing Patent Reply Brief at 44.

As discussed at length in connection with the '401 and other patents, Respondents' proposed construction must be rejected in view of the patent claims and other evidence. Respondents have not demonstrated that the '764 patent claims and specification, or other evidence, require Respondents' proposed interpretation. Furthermore, the Administrative Law Judge does not find any indication in the claims or other intrinsic evidence that the term "periodic," as used in the '764 patent, should be limited in the manner proposed by Respondents.

Whether the Claims Require a Record Carrier Operating in a Recording Device

Respondents argue that the asserted claims of the '764 patent require a record carrier operating in a recording device because the address codes specify information that is only meaningful and accurate when the record carrier is spinning at a certain velocity in a recording or reproduction device. Respondents make no arguments that differ materially from those advanced in connection with the '401, '856 and '825 patents. *See* Respondents' Post-Hearing Patent Brief at 44. As in the case of the '401, '856 and '825 patents, there is no reason to adopt Respondents' proposed interpretation, especially in view of the fact that the asserted claims of the '764 patent read on a "record carrier" and its properties, not a recording device or a method of using a recording device.

"Auxiliary Codes"

Respondents argue that in accordance with the language of independent claim 20 of the '764 patent, the "auxiliary codes" are used to "specify[ ] control data for use by a recording device in recording an information signal on said track." Respondents' Post-Hearing Patent Brief at 43. Respondents further argue that the auxiliary codes claimed in the '764 patent cover synchronization codes, such as those disclosed in the '856 and '825 patents. They argue that synchronization codes provide the information necessary to record information onto a record carrier, and that Figure 2 of the '764 patent shows alternating synchronization signals and address codes as an "auxiliary signal." *See* Respondents' Post-Hearing Patent Reply Brief at 10-11.

Philips argues that Respondents impermissibly attempt to equate "auxiliary codes" with synchronization signals in order to cite prior art that otherwise lacks relevancy and could not render the asserted claims of the '764 patent invalid. *See* Philips' Post-Hearing Patent Brief at 41. It is argued that Respondents' proposed interpretation of the term "auxiliary codes" cannot be reconciled with the plain language of the claims, the specification or the prosecution history, in which the operation and structure of auxiliary codes are clearly defined and differentiated from synchronization signals. *See Id.* at 42-43.

The Commission Investigative Staff provides a detailed explanation of how auxiliary codes are used on a disc, and argues that the specification of the '764 patent clearly specifies that auxiliary codes do not include synchronization signals, which signals the system that an address code or auxiliary code is about to begin or end. *See* OUII Post-Hearing Brief at 8-10, 26-28.

The '764 patent defines the operation and structure of the claimed auxiliary codes. *See, e.g.*, Hesselink Tr. 642-45; CX-16/RX-57 ('764 Patent), col. 4, line 44 through col. 5, line 31. Auxiliary codes are described in the specification as containing specific information that the recording device can extract from the record carrier, or disc, and use for controlling the recording process. CX-16/RX-57 ('764 Patent), col. 2, lines 7-12; Hesselink Tr. 2588-2589. The specification describes how the control information tells the recorder, *inter alia*, where a table of contents should be recorded, the address at which the lead-out area starts, the optimum write energy for recording on the disc, the type of record carrier and the write strategy. *See* CX-16/RX-57 ('764 Patent), col. 5, line 61 through 7, line 62.

As recited in claim 20, the "auxiliary signal" used to modulate the wobbled pre-groove of the disc comprises (1) address codes and (2) auxiliary codes, the latter characterized as "specifying control data for use by a recording device in recording an information signal on said track." CX-16/RX-57 ('764 Patent), col. 14, lines 21-29. By contrast, synchronization codes violate the rules used by the information-carrying codes. Philips' technical expert analogized them to punctuation marks, which do not provide information in the way that text does. Hesselink Tr. 2591-2592, 2595.

The specification explicitly distinguishes auxiliary codes from synchronization signals. Contrary to Respondents' characterization of Figure 2, the '764 patent specification explains that Figure 2 provides "an example of a suitable auxiliary signal comprising code signals **12** which alternate with synchronized signals **11**," and discloses that address codes and auxiliary codes can be placed in the code signals **12**, not in the synchronization signals **11**. The specification then describes how the auxiliary codes are distinguished from address codes by specific bit combinations. CX-16/RX-57 ('764 Patent), col. 4, line 44 through line col. 5, line 11; Hesselink Tr. 2586-2593. The specification also discloses that the address and auxiliary codes may be distinguished by being "preceded by different synchronization signals **11**," which is a further recognition of the fundamental difference between auxiliary codes and synchronization signals. CX-16/RX-57 ('764 Patent), col. 6, line 64 through col. 7, line

6.

In addition, it appears that the PTO recognized the distinction between synchronization signals and the '764 patent's auxiliary signals and the auxiliary codes. During prosecution, the Examiner cited U.S. Patent No. 4,375,088 to de Haan et al. (RX-77) as disclosing the "invention substantially as claimed." The Examiner noted that de Haan disclosed many features, including a "sync area," a "clock signal" and a "modulation process clock signal." Nevertheless, the Examiner noted that de Haan "does not disclose the use of an auxiliary signal." In order to find auxiliary signals and auxiliary codes in the prior art, the Examiner had to look at other art, beyond de Haan, with its "sync area." The Examiner stated that in order for the optimal laser power level to be specified, de Haan would have to be modified to include "test words, i.e. auxiliary codes" disclosed in U.S. Patent No. 4,631,713 to Romeas et al. *See* CX-41, CX-42/RX-93 ('764 Patent Prosecution History), Paper No. 5 at 3-4, Notice of References Cited (with a copy of the Romeas patent included therewith).

In subsequent Remarks to an Amendment, the Applicants stated that while de Haan disclosed a record carrier with synchronization areas and a track was transversely modulated by a clock and tracking signals, the Examiner was correct in discerning that de Haan nevertheless did not disclose auxiliary signals in the form of address codes and auxiliary codes. The Applicants disagreed, however, that the missing elements could be supplied by the other art cited by the Examiner, arguing, among other things, that it was likely that the cited prior art patents were not compatible and could not be combined. *See* CX-41, CX-42 ('764 Patent Prosecution History), Paper No. 7 at 17-18. The '764 patent issued over de Haan and Romeas. *See, e.g.*, CX-16/RX-57 ('764 Patent).

The '764 prosecution history appears, therefore, like the '764 patent specification to indicate to one of ordinary skill reading the document that the auxiliary codes are separate from synchronization signals.

Having reviewed the claims, the specification and the prosecution history of the '764 patent it is clear that the term "auxiliary codes," as used in the asserted claims does not include synchronization signals.

B. Infringement Determination

Philips argues that Respondents' accused products directly infringe the asserted claims of the '764 patent. It is argued that infringement was demonstrated by tests performed by Philips' technical expert. Philips also argues that additional evidence of infringement is found in Respondents' documentation concerning the ATIP encoder of the accused discs, and Respondents' admission that their discs are Orange Book compliant. Philips' Post-Hearing Patent Brief at 43.

Respondents argue that their accused products do not infringe any asserted claim of the '764 patent because all the asserted claims require a record carrier operating in a recording device. With respect to asserted claim 24, Respondents further argue that when it is properly construed there is no infringement because the accused discs do not have tracks with the required "periodic" excursions. Respondents' Post-Hearing Patent Brief at 44-45; Respondents' Post-Hearing Patent Reply Brief at 12.

The Commission Investigative Staff argues that the accused products infringe the asserted claims of the '764 patent without the use of a recorder or player, and that when claim 24 is properly construed, the accused products have a track that is "traversely modulated such that there is a periodic excursion." OUII Post-Hearing Patent Brief at 23 (citing Hesselink Tr. 646-647, 650-651).

Respondents' defense to Philips' allegations of infringement is based on their proposed claim construction, which has been rejected. Philips has demonstrated by at least a preponderance of the evidence that Respondents' accused products directly infringe the asserted claims of the '764 patent.

C. Validity

Respondents argue that the asserted claims 20 and 32-34 of the '764 patent are anticipated by the prior art, and that asserted claims 23-31 of the '764 patent are obvious in view of the prior art. Therefore, it is argued that all asserted claims of the '764 patent are invalid. *See* Respondents' Post-Hearing Patent Brief at 46-50; Respondents' Post-Hearing Patent Reply Brief at 16.